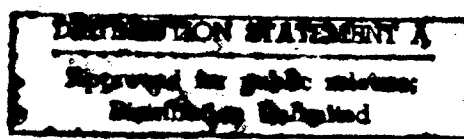




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# ***JPRS Report***



# **Nuclear Developments**

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# Nuclear Developments

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## SOUTH AFRICA

### Pik Botha Denies Israeli Missile Links

*MB2710114289 Johannesburg SAPA in English  
1114 GMT 27 Oct 89*

[Text] Pretoria Oct 27 SAPA—A spokesman for the Department of Defence in Pretoria on Friday dismissed suggestions of co-operation between South Africa and other countries in the nuclear arms field.

He said the aim of arms research was to advance South Africa's own military technology.

And the minister of foreign affairs, Mr Pik Botha, said on Friday he "bore no knowledge" of alleged co-operation between Israel and South Africa in the building of a South African nuclear missile.

Mr Botha denied reports that he had declined to comment on the story that Israel was helping South Africa build a nuclear missile.

"The minister bears no knowledge of such co-operation," was the wording of Mr Botha's statement on the matter.

### Commission Views West Coast for Nuclear Sites

*MB2710095489 Johannesburg SAPA in English  
0939 GMT 27 Oct 89*

[Text] Cape Town Oct 27 SAPA—An investigation of the west coast is to be initiated by ESKOM [Electricity Supply Commission] "in the immediate future" to establish potential nuclear power station sites, ESKOM said in a statement in Cape Town on Friday.

Some research staff are already in the area under investigation—which stretches from just north of Hondeklipbaai to south of Port Molloth.

ESKOM said locating a nuclear power station on the west coast offered certain distinct advantages.

"It is an area desperately in need of economic development, which a power station would stimulate. It is close to the Vaalputs nuclear waste repository. As the study of the area has only just been launched, no suitable sites have as yet been identified.

"The identification of sites on the west coast will certainly not preclude power stations being built in other suitable areas, as there is a need to balance the grid and to avoid too great a concentration of power stations in one area," ESKOM said.

ESKOM has more than adequate generating capacity planned or in existence to provide its generating needs till at least the beginning of the next century, after which additional capacity will be needed. This will increasingly be derived from nuclear power as existing coal reserves run down.

ESKOM said 19 target areas on the SA [South African] coast have been identified as possible suitable sites.

One site has already been identified and approved and is being purchased. This site is situated at Thyspunt/Tony's Bay, which is between Cape St. Francis and Oyster Bay in the Eastern Cape.

Various other areas have been investigated and found unsuitable, including those on the Natal north coast and those immediately north of Port Elizabeth.

Studies in the Southern Cape between Gansbaai and Agulhas are now nearing completion and ESKOM expects to be in a position to make an announcement soon.

**Nuclear Research Shifts to Civilian Use**

*HK3010004089 Beijing CHINA DAILY (BUSINESS WEEKLY) in English 30 Oct 89 p 4*

[By Huang Xiang and Zhang Yu'an]

[Text] China's nuclear research and design industry is facing a great change in its purpose—to shift from mainly military pursuits of the past to civil uses from now on and in the future, an expert told BUSINESS WEEKLY recently.

This is in keeping with an easing of international tensions and the needs of the country's socialist modernization programme which requires abundant power supplies to fuel the energy-hungry economy.

Although total energy production in the first half of this year increased by 5.9 percent over the same period last year, many places, especially those industrialized areas in Northeast China and the coastal provinces, are still short of energy.

At the moment, the average yearly electricity consumption per person in China is only about 300 kilowatt-hours.

By the year 2000, the figure should jump to over 1,000 kilowatt-hours.

Thus, expanding power generating capacity remains a top priority.

Premier Li Peng called attention a few years ago to the need for developing China's nuclear power industry.

He said, "Rich in coal and hydroelectric resources, China has mainly relied on coal-fired and hydro-power generation to meet its needs for electricity. However, nuclear power should also be developed because:

"China has fairly abundant deposits of uranium;

"China has built up a comprehensive nuclear industry and a team of technical personnel, which provides favourable conditions for the development of nuclear power plants."

He stressed the need for developing nuclear power especially in the coastal areas where manufacturing is well established but lacking in energy resources.

At present, the Daya Bay Nuclear Power Station jointly constructed with foreign companies, will be the first large nuclear power plant in China when completed.

At the same time, a 300,000-kilowatt nuclear power plant at Qinshan, Zhejiang Province is being built mainly by China's own efforts. This effort is expected to contribute to the strengthening of the country's self-reliance and its ability to master foreign technology for the construction of large nuclear power plants.

"In view of China's economic strength, however," Li said that "it cannot afford to build many plants at once."

He said the tentative plan was to build four large and medium-sized nuclear power plants by the end of the century with a rated-power of possibly up to 10 million kilowatts.

Another two, one in east China's Jiangsu Province and the other in northeast China's Liaoning Province, will be built. Both are in more industrialized areas of China.

The Premier urged the import of technology to manufacture nuclear power generating equipment rather than continuously relying on imported equipment.

Liu Guoming, president and senior engineer of the Beijing Institute of Nuclear Engineering, China's largest comprehensive nuclear engineering institute, said his institution is engaged in a large scale research programme to design and develop China's own nuclear power plants.

He said it is expensive to transport coal, oil and hydroelectric power from western China to the major power consumers in the east. In some areas, it is well nigh impossible due to the terrain and the country's limited transportation facilities.

So, the nuclear power industry must be developed in the near future to meet the needs in these areas.

More importantly, this will also pave the way for large scale nuclear power development in the future.

Liu is confident that people will realize in the next century that without large scale development of nuclear power, China's economic development will be impeded for lack of enough energy.

Liu's institute helped design the first phase of the Qinshan Nuclear Power Plant in Zhejiang Province. It has been awarded the contract to design the second phase of the project, namely to build two 600,000-kilowatt nuclear power generators.

Liu said a number of these 600,000-kilowatt nuclear power generators will be built by the end of this century.

The design for the second phase project of the plant will be completed this year, Liu said.

The institute, with a staff of more than 2,100, including 574 senior engineers, has contributed a great deal to the country's nuclear arsenal.

It researched and designed the large graphite water-cooled reactor for the production of weapons-grade nuclear materials and the reprocessing plant for spent nuclear fuel.

Furthermore, the institute participated in designing China's nuclear submarines.

The development of the nuclear power industry is governed by two factors: safety and economic efficiency.

Liu said that from the very beginning, China has paid much attention to these two factors, especially the safety issue.

In addition, the Beijing Nuclear Safety Inspection Centre has been set up under the institute to carry out special inspections on nuclear power plants and their facilities.

To further improve the safety and economic efficiency of nuclear power plants, the institute is undertaking feasibility studies on technology for building the pressurized water reactor.

Because the core of this reactor is in a pressurized pool of water, the reactor can be stopped automatically when something goes wrong, Liu said, adding that it is also being studied abroad.

Liu believes that because of its high safety factor, the reactor can be built in suburban areas. Moreover, the heat generated as a by-product can be fully utilized in metropolitan areas to increase the economic efficiency of the power plant.

At the moment, most nuclear power plants are built at least 40 kilometres from large cities in case of an untoward event, Liu said.

The institute, in co-operation with other research units, is also studying another safe reactor—the high temperature reactor, which, in addition to generating electricity, can also provide heat at high temperatures for industrial consumers.

Meanwhile, the institute is also studying a low temperature reactor which is designed specifically to provide heat for consumers.

There are still useful isotopes and radioactive wastes left in the spent fuel from a nuclear power plant. These must be reprocessed in a special plant with complex technology.

The institute is designing its first such reprocessing plant.

Nuclear waste disposal is another important topic in the development of nuclear power. In this respect, the institute is doing research along the following lines: cement-solidification, bituminization and vitrification and has achieved significant results.

To absorb the latest technology in civil nuclear industrial development, the institute has established ties with more than 20 countries, including the United States, Canada and Italy.

Liu said he wished to co-operate further with foreign companies and institutes to promote China's civil nuclear power industrial development.

### Report Praises Nuclear Workers

HK1511013789 Beijing ZHONGGUO XINWEN SHE  
in Chinese 0645 GMT 8 Nov 89

[Report by Correspondent Zhu Dagiang (2612 1129 1730): "Heroes and Heroines in the Western Part of the Country—Story of Sons and Daughters on the Desert Who Make Contributions to the Development of China's Nuclear Undertaking"—ZHONGGUO XINWEN SHE headline]

[Text] Urumqi, 8 Nov (ZHONGGUO XINWEN SHE)—On 16 October 1964, China successfully launched its first atom bomb on the Lop Nor Desert.

This boosted China's national might and military prowess.

In the last 30 years, the sons and daughters of the vast desert have selflessly dedicated their all including youth to the nuclear cause of the motherland.

### A Veteran Takes the Field

After New China was established, some big powers constantly nuclear-blackmailed China using atom bombs in their hands, in a vain attempt to strangle the newborn republic in the cradle.

"We cannot afford not to have atom bombs." Mao Zedong thus made a policy decision.

The government began deploying forces and set up an atom bomb range in the western region of the country.

In September 1958, the Central Military Commission appointed old General Zhang Yunyu who had fought north and south on many fronts to found and defend New China the first Commander of the nuclear test base.

Since then his name has been part of the history of the base's founding.

It was he who was the first to raise an objection to the first and earliest proposition to choose Dunhuang as a nuclear base and his move was thus affirmed.

It was he who personally drove a truck and led "a convoy of jeeps" in carrying out prospecting in the horrifying Lop Nor region and driving piles into the ground.

It was he who led the base's technicians and construction troops in overcoming one difficulty after another so that China's first atom bomb test whose code name was "59.6" task could be conducted smoothly.

At the last juncture prior to the detonation of the atom bomb, this old general decidedly climbed the 100-meter-high iron tower which propped up the atom bomb to "boost the courage" of the technicians who were installing detonating caps and he was the last to leave the site.

When people were watching the soaring mushroom cloud, admiration for General Zhang welled up in their hearts.

### **The Love of 'Nuclear Big Sisters'**

In the early 1960's, a batch of sons and daughters of the Chinese nation who dedicated themselves to the nuclear cause and the Gobi Desert came to this base. "In a snap of the fingers," among them some 20 women have reached their fifties. The years of their youth have gone and they have dedicated their love to the peace of mankind..."

They have lost a great deal. Some of them remain singles up to this this day, without love and families of their own. When talking about this situation, bursting into sorrowful tears, they would say: "We worry about nothing but our work."

"Tom Boy" Zhai Fangzhi, "Islam" Assistant Fellow Researcher Bao Quzhen, "Old Fellow" from Mulan Village Zhou Yufang are all women without men but all known as happy-go-lucky persons. They are dubbed "three never fading flowers." Zhai Fangzhi is in charge of the interface work of the "artery" cable of the atom bomb. She works vigorously. About 40 years old, she still wears two pig tails. She has a longing of her own. She is very fond of children. On a wall of her "boudoir" she has a picture of a lovely boy. How does she long for a sweet home? However, due to a strange combination of social intercourse conditions in the border area, love on her part has elapsed with the passage of time.

The test instrument manufactured by Bai Juzhen and her colleagues is called experts as "a milestone in nuclear test."

Zhou Yufang once worked side by side with her husband. However, the latter who worked in the base for a long time broke down from constant overwork and left the former forever. Zhou Yufang let her son carry on the cause left unfinished by his father. Hence her family became "a nuclear family."

The "nuclear big sisters," who "hold up half the sky" of the nuclear test base, are heroines deeply respected by many. Now batch after batch of "nuclear girls" have arrived at Lop Nor to continue their dedication to the nuclear cause.

### **Red Willows on the Vast Desert**

A sentry post was decorated by a beer bottle full of water with a red willow being inserted in it.

This is a scene of the sentry post nearest to the center of detonation of the first atom bomb. The red willow is the symbol of life on the desert. It accompanies the soldiers working here day in and day out.

The Lop Nor Nuclear Test Base, a military restricted area which has a circumference of 12,000 kilometers, is guarded by these "common soldiers" all the year round.

One day, we got up very early and dove for several hundred li to visit all in the nuclear test ground and the sentry post as well. There were three soldiers in the post. In their kitchen we saw a piece of thick flatbread on the pan, but we found no vegetables. I asked squad leader Corporal Mao Zhiyong: "Why do you not have any foodstuffs?"

"The supply car provided us some fresh vegetables but since it tossed several hundred li on the desert for a very long time, when they reached us, they had become dried vegetables. In fact, we still have some canned meat but we are reluctant to eat it."

"Do you find life hard here?"

"It is really hard but we are already accustomed to it. What troubles us most is that life is too monotonous and uninteresting."

The task of the sentry post is to watch and protect the nuclear facilities of the test ground and ensure the smooth operation of its telecommunications lines. The masters of row upon row of houses near the sentry post have moved away and now only two or three soldiers stand guard on the remote and uninhabited desert and are leading a life almost completely "cut off from the outside world" all the year round.

Simple and unadorned, they always smile when meeting people without speaking a lot like red willows that take root on the vast desert.

### **Multiple Applications for Nuclear Energy Explored**

*HK0511082089 Beijing JIEFANGJUN BAO  
in Chinese 20 Oct 89 p 19*

[Report by Xue Ren (5641 0088): "A Nuclear Test Base Boldly Opens Up New Fields in Nuclear Energy, Nuclear Technology, and Peaceful Utilization of Nuclear Energy"]

[Text] A nuclear test base opened another two factories turning out products for civilian use in September this year. That was a new action by this test base in opening up new fields in nuclear energy, nuclear technology, and peaceful utilization of nuclear energy.

It is learned that by direct application of nuclear technology to production in the test base-run factories, the processing of products to render services to economic construction and people's livelihood has been a bold attempt of the test base to open up nuclear energy, nuclear technology, and peaceful utilization of nuclear energy.

The test base has presented some 100 results of scientific research since 1987. Some of the results have been awarded national prizes for important progress in science and technology; some were the first of their kind in China; others have been put into production in batches; and still others have already created marked economic



results and social benefits. They have each contributed to making nuclear energy and nuclear technology bring benefits to mankind.

With the strategic shift in the guiding idea of science, technology, and industry for national defense, the test base has readjusted its scientific research and managerial structure, with a special technological development center for civilian purposes set up to be in specific charge of the selection of topics, information gathering, and organizational coordination. Eight organs of scientific research under the test base currently are doing research in this domain.

Compared with some foreign specialized research institutes in exploring nuclear energy, nuclear technology, and the peaceful utilization of nuclear technology, the test base has scored pleasing progress even in a very short time since such undertakings began. They have succeeded in developing the first "automatic apparatus for blade surface," which is capable of observing the growing conditions of plants through analysis of the blade surface by applying optical and electronic technologies. Such apparatus can be used widely in forestry and farming and has drawn the attention of experts at exhibitions held in Beijing and Shenzhen. Transmitting lasers through optical fibers to break up blockages in human blood vessels has been proven highly effective in the treatment of heart disease, coronary heart disease, and thrombus. By adopting the technology of nuclear radiation, scientists at the test base have succeeded in developing an electronic (impulse) static electric accelerator for detecting flaws in products, thus improving product quality by finding a solution to a most difficult problem. The newly developed lightning monitor is capable of monitoring the distance of lightning and the direction of its movement and whether it will cause danger. When this monitor is installed in civil airports as a lightning-proof device, it will have the effects of an eye and an ear. The technology of radioactive atomic analysis has already been adopted by several hospitals in Xian to analyze whether the organizational factors and elements of human cells are normal in diagnosing the nutrition, disease, and health condition of the human body....

In the course of developing the peaceful utilization of nuclear technology, the test base has widened its perspective and knowledge through social contacts and external exchanges; consequently, the test base's level of scientific research and automation have greatly improved, while its economic income has been on the rise.

#### **Nuclear Technology Applied to Nonmilitary Use**

*HK3010004289 Beijing CHINA DAILY (BUSINESS WEEKLY) in English 30 Oct 89 p 4*

[By Huang Xiang and Zhang Yu'an]

[Text] For many Chinese, the nuclear industry inspires visions of such powerful weapons as the atom bomb or the more devastating hydrogen bomb.

However, since 1979, the industry has been transforming itself into "an ordinary profession with more and more of a civilian nature," in the words of Wang Qing, from the China National Nuclear Corporation (CNNC).

The CNNC official told BUSINESS WEEKLY recently the corporation, the former Ministry of Nuclear Industry, has applied nuclear technology to non-military production and developed over 1,000 products for civilian use in the past decade.

"This once purely defence industry is now making strides in such civilian fields as developing nuclear power, isotope and radiation technology, and civilian products," said Wang, division chief with the one-year-old CNNC.

The Qinshan Nuclear Power Plant, a totally domestic effort, in China's south-eastern coastal province of Zhejiang is expected to go on line by the end of 1990. The construction of the Daya Bay Nuclear Power Station in Guangdong Province is well underway. Wang said the research on isotope and radiation technology started in the 1950's. This research includes isotope products, nuclear instruments, accelerators, radiation technology, and the application of nuclear technology to agriculture and medical treatment.

In agriculture, for example XINHUA reports that Chinese scientists have developed 285 new strains of 23 crops and plants on 14 million hectares of land by utilizing nuclear radiation which has increased grain output by 3.5 million tons and produced profits of 5 billion yuan (\$1.3 billion).

Among the new breeds developed by radiation, "Yuanfengzhao" rice, "Lumian-1" cotton, and "Tiefeng-18" soy beans have been awarded national first class medals for invention, the XINHUA report said.

Since 1979 the corporation has been developing civilian products, a policy that applies to other defence industries as well.

The total value of civilian products this year, which is expected to be 580 million yuan (\$156 million), is six times more than a decade earlier. It now makes up one-third of the industry's output value, Wang disclosed.

During the Seventh Five-Year Plan (1986-90), the corporation's 60 enterprises initiated 112 civilian projects, a total investment of 8880 million yuan (\$238 million). Seventy-seven of them may be completed by the end of 1990.

Major projects include a fire-arms factory, a chemical fertilizer plant, a lithium battery factory, an aluminium foil and other rolled-aluminium factory, and a soda plant.

Many of the corporation's high-tech projects are using foreign technology. Partners are from the United States, West Germany, Switzerland, and Yugoslavia.

CNNC currently employs 300,000 people in 21 research institutes and 100 enterprises.

### Li Peng Signs Radiation Protection Decree

OW0211065889 Beijing XINHUA Domestic Service  
in Chinese 1309 GMT 1 Nov 89

["Local Broadcast News Service"]

[Text] Beijing, 1 Nov (XINHUA)—To step up supervision and management over protection against radioisotopes and radiation from beam installations and to ensure the health and safety of those whose work involves radiation as well as that of the public, State Council Premier Li Peng on 24 October signed into law the 44th State Council decree and promulgated the "Regulations Governing Protection Against Radioisotope and Beam Installations."

The "regulations" stipulate: From now on, the state will implement license registration in connection with radiation work. Radiation protection facilities in all radiation work places either newly built, renovated, or expanded, must be inspected and approved after completion by health, public security, and environmental protection departments and receive license registration certificates before opening for use. Those involving the emission of radioactive waste in liquid, gas, or solid form, must submit environmental impact reports to environmental protection departments at the provincial, autonomous regional, or municipal level and obtain approval from them before applying for registration.

Regarding the management of protection against radiation, the "regulations" stipulate: Administrative departments are responsible for managing the protection against radiation from units under their individual jurisdiction. Protection facilities must be installed in places making, using, or storing radioisotopes, as well as in places manufacturing or using beam facilities. Radiation signs and necessary protection security interlocking mechanisms, alarm systems, or signals must be installed at the entrances to those places.

The "regulations" also provide for specific stipulations in connection with the management of radiation accidents, supervision over radiation protection, and punishment for violating the regulations. The "regulations" state: Those who breach the regulations and cause radiation accidents with minor consequences will be dealt with by public security agencies in accordance with the "public security management and punishment regulations"; those whose radiation accidents entail grave consequences and constitute a crime will be dealt with by judicial agencies.

### Daya Bay Nuclear Plant Meets High Standards

HK2310062289 Beijing RENMIN RIBAO in Chinese  
16 Oct 89 p 2

[Dispatch by reporter Huang Xingqun (7806 2622 5028):  
"Construction Work on Daya Bay Nuclear Power Plant Is of High Quality"]

[Text] Daya Bay, 15 Oct—The third meeting of the Nuclear Safety Consultation Committee of the Guangdong Daya Bay Nuclear Power Plant was convened at the construction site yesterday as scheduled. Ten committee members of the Nuclear Safety Consultation Committee from Hong Kong listened to a detailed report on the progress of the plant's construction provided by the Guangdong Nuclear Power Plant Joint Venture Corporation and visited the construction site, meeting Chinese and foreign nuclear industry experts.

The reporters learned that the construction of the Daya Bay Nuclear Power Plant is being carried out according to schedule. Regarding design and equipment, the three contracts for the supply of equipment and engineering services for the nuclear island and regular island are being fulfilled as promised. Ninety-five percent of the construction of equipment for the No 1 nuclear island has been completed, and construction of much of the key equipment is in its final stages. In the area of civil engineering, 65 percent of construction of the key body has been completed, and the No 1 reactor is in the final stage of installation.

Wong Pao-yin, chairman of the Nuclear Safety Consultation Committee and a prominent figure in Hong Kong industrial circles, told reporters that since being informed of various aspects of the situation, the Nuclear Safety Consultation Committee has been very satisfied with the progress of the project. Mr Ho Chung-tai, vice chairman of the Nuclear Safety Consultation Committee and a Hong Kong professional, said: The construction site of the nuclear power plant makes a good impression, the site is orderly, and the cement and steel laying work meet high standards. He says that it is difficult to carry out construction according to schedule when there are over 10,000 people working together, but they have done it nevertheless.

The problem of safety is still of concern to people. At the press conference, a reporter asked Grenville, the responsible person of the joint venture corporation's quality guarantee section: "How would you judge the quality of construction of the Daya Bay Nuclear Power Plant by international standards?" This nuclear power expert from the United States answered: So far, the quality of construction of this power plant being built in Guangdong is very high. The builders here attach great importance to quality and safety. I believe that after this nuclear power plant is completed, it will be second to none in the world.

### UN Envoy Reviews Nuclear Cooperation Policy

OW2710011989 Beijing Domestic Service in Mandarin  
1200 GMT 26 Oct 89

[By reporter (Qian Yirun) from the "National Hookup" program]

[Text] Chinese representative Hou Zhitong spoke at yesterday's plenary meeting of the 44th United Nations General Assembly session when an annual report of the International Atomic Energy Agency was being reviewed and discussed. He elaborated on China's policy of nuclear cooperation with other countries.

Hou Zhitong said: In nuclear cooperation with other countries, China strictly abides by the policy of not standing for, encouraging, or assisting in the development of nuclear weapons by other countries. When exporting nuclear materials and equipment, China asks the importing countries to put these materials and equipment under the guarantee [bao zhang] of the International Atomic Energy Agency. In importing nuclear materials and equipment, China ensures that they will be used for peaceful purposes.

He continued: China is developing nuclear electric power vigorously and in a safe way. It always keeps to the principle that quality and safety are of primary importance and devotes great efforts to conducting international cooperation in ensuring the safety of nuclear electric power.

### Scientists Term Nuclear Reactor 'Satisfactory'

OW2510012589 Beijing XINHUA in English  
1505 GMT 24 Oct 89

[Text] Chengdu, October 24 (XINHUA)—China's largest experimental controlled nuclear fusion reactor has operated safely for five years and achieved satisfactory results, according to scientists at the Southwest China Physics Institute.

The reactor is an important step in China's research in nuclear fusion power. Nuclear fusion could provide the earth with an inexhaustible energy supply, because sea water abounds in fusion fuel.

The reactor, designed, manufactured and installed by Chinese scientists, went into operation in April 1984.

### Neutron Velocity Spectrometer Passes Test

OW0511151689 Beijing XINHUA Domestic Service  
in Chinese 1311 GMT 31 Oct 89

["Local Broadcast News Service"]

[Text] Beijing, 31 Oct (XINHUA)—A twin-rotor neutron velocity spectrometer [shuang zhuanzi zhongzi feixing shijian puyi 7175 6567 1311 0022 1311 7378 5887 2514 7035 6225 0308] developed by the Chinese Research Institute of Atomic Energy Sciences passed a technical test recently. A neutron velocity spectrometer is a large precision instrument for studying the molecular and atomic vibrations in condensed matter through reactor-assisted experiments on thermal neutron radiation. It plays a significant role in materials science research. The spectrometer that passed the test was designed and manufactured by Chinese scientists and technicians. Experts say the instrument has attained the technical standards of similar foreign-made equipment.

## JAPAN

**Nuclear Plant Safety Talks With ROK, PRC***OW0911164889 Tokyo KYODO in English  
1337 GMT 9 Nov 89*

[Text] Tokyo, Nov. 9 KYODO—Japan plans to step up consultations with China and South Korea on how to maintain the safety of nuclear power plants, Foreign Ministry sources said Thursday. The ministry will cooperate with China and South Korea on the safety of such plants because of the 1986 Soviet nuclear power plant disaster in Chernobyl, the sources said.

Japan and China are to hold a director-level meeting in Tokyo early next year to discuss how to step up cooperation on the safety of plants. Japan has suspended high-level meetings with China since the Chinese Government clamped down on pro-democracy demonstrators in Tiananmen Square in June. The first meeting of its kind was held in Beijing in January. Both countries agreed to meet once each year on a basis of the Japan-China nuclear power agreement.

Japan and South Korea agreed to carry out seven joint projects to secure the safety of nuclear power plants during a bilateral science and technology committee meeting in Seoul early last month. Among the seven projects are exchanges of information and technical cooperation on the safety of the plants.

Japan has 28 nuclear power plants that produce more than 25 percent of the nation's electricity in 1988. South Korea owns nine plants that produce 47 percent of that nation's electricity. China is building a nuclear power plant and plans to build six more plants.

## TAIWAN

**Space Commission To Guide Rocket Research***OW0511150389 Taipei LIEN HO PAO in Chinese  
23 Oct 89 p 1*

[By reporter Han Shang-ping]

[Text] The Executive Yuan will set up a "Commission in Charge of Guiding the Development of Space Science and Technology," to be headed by Premier Li Huan. A "Preparatory Office for the Establishment of a Space Laboratory" will be created under the commission. An exploratory rocket is scheduled to be launched in 1991, and a low-orbit satellite will be launched by the end of 1993.

The National Science Council [NSC] under the Executive Yuan has set up a planning group to chart Taiwan's "first-stage action program for the development of scientific research into artificial satellites," covering the period from this month until July 1994. The program, however, has encountered opposition from some people in the scientific and technological community.

According to the program, the planning group will be composed of technical and management personnel. In addition to this group, a consultation panel will be set up with the help of experienced professionals from home and abroad. The two groups are scheduled to complete a detailed plan by next March, working out such specifics as the establishment of the guiding commission, the setup and management of the preparatory office for a space laboratory, a detailed listing of research and development efforts for a 5-year period, a scheme for the utilization of manpower and the yearly recruitment of personnel, and budget projections.

The guiding commission and the preparatory office are due to be established by next April. The commission will be headed by the premier. Its members will include pertinent ministers under the Executive Yuan and local and overseas scientists. Subgroups will be set up under the preparatory office to take charge of the development of satellite and carrier rocket launch systems. There also will be subgroups responsible for space science research and the development of an electronic surveying, tracking, and control system. In addition, a professional consultation commission will be created under the preparatory office.

Under the program, exploratory rockets will be launched in 1991 and 1992. Launching, data collection, and electronic surveying, tracking, and control systems will be tested. A low-orbit satellite will be launched by the end of 1993.

Professor Li Yuan-che, of the University of California at Berkeley in the United States, recently sent a letter to the NSC's photoelectricity research group indicating his preference for photoelectricity over space science if Taiwan had to choose one of them for development.

Physics Professor Liu Yuan-chun, of the National Soochow University, said the government's policy-making process in this regard was reprehensible because the decision to spend New Taiwan \$10 billion to develop space technology was made after only one feasibility study. There was little discussion of the plan in the government's program of major scientific and technological projects and at previous national science conferences and national science advisory meetings. He suggested that a final decision be made after discussion at the national science conference next year.

A scientist, speaking on condition of anonymity, commented that even if the 5-year plan was carried out successfully, the satellites could only essentially observe the gaseous composition of the solar surface and other relevant phenomena. He added that more efforts, time, and money must be expended to develop satellites for such practical purposes as weather forecasting, surveying of natural resources, and communications. He was not sure whether it would be worthwhile to do so. Another scientist noted that if the space development program was indeed to be carried out, the NSC should only

oversee the operations and leave the planning to pertinent research institutes in Taiwan.

NSC Chairman Hsia Han-min indicated that Premier Li Huan had given basic instructions in this regard in his recent administrative report to the Legislative Yuan, adding that details in the instructions could be altered in the course of working out an implementation plan.

## VIETNAM

### World Nuclear Energy Specialists Visit Vietnam

*BK1411085689 Hanoi VNA in English 0732 GMT  
14 Nov 89*

[Text] Hanoi VNA Nov. 14—A team of three officials representing the International Atomic Energy Agency (IAEA) and the Australian Nuclear Science and Technology Organization paid a working visit to Vietnam from Nov. 2-8 at the invitation of the Vietnam National Institute for Atomic Energy.

The team comprised David John Cook, executive chairman of the Australian organization, Peter Airey, coordinator of the Asia-Pacific Regional Cooperative Agreement of the IAEA; and Manoon Aramrattana, UNDP-RCP [UN Development Program-Regional Conservation Program] coordinator.

The international guests called on a number of institutions and establishments which research and apply nuclear technology in Ho Chi Minh city, Hanoi and Da Lat (capital of the central highlands province of Lam Dong).

Vice-Chairman of the Council of Ministers Vo Nguyen Giap warmly received David John Cook here on Nov. 5, while Peter Airey and Manoon Aramrattana had a number of exchanges of views with leading officials of the Vietnam National Atomic Energy Institute and other Vietnamese scientists concerned with the application of nuclear technology in health care service, agriculture and industry.

### Official Signs IAEA Safeguard Agreement

*BK0211151989 Hanoi VNA in English 1445 GMT  
2 Nov 89*

[Text] Hanoi VNA November 2—Representative of the Vietnamese Government, Nguyen Dong Hai, who is also vice director of the Vietnam Atomic Energy Institute, has signed the safeguard agreement integrated with the Treaty on Non-Proliferation of Nuclear Weapons.

The signing took place at the 33rd regular general session of the International Atomic Energy Agency (IAEA) held in Vienna (Austria) from September 25-29, 1989 [date as received].

## BULGARIA

**Stoichkov Receives Cuban Nuclear Energy Official**

*AU0910140889 Sofia RABOTNICHESKO DELO  
in Bulgarian 4 Oct 89 p 2*

[BTA report: "Cooperation in Nuclear Power Supply"]

[Text] On 3 October Grigor Stoichkov, deputy chairman of the Council of Ministers, received Fidel Castro Diaz, secretary of Cuba's National Committee on Peaceful Use of Nuclear Energy.

Information was exchanged on the new tendencies in the peaceful use of nuclear energy in the two countries. Special attention was devoted to strengthening cooperation between Bulgaria and Cuba in this area, and the necessity of strengthening and expanding cooperation in utilizing nuclear energy for peaceful goals, first of all in agriculture, industry, chemistry, and medicine, was pointed out.

The meeting was attended by Ivan Pandev, chairman of the Committee for Peaceful Use of Atomic Energy at the Council of Ministers, and Manuel Perez Hernandez, Cuban ambassador to Bulgaria.

## CZECHSLOVAKIA

**Reasons for Nuclear Plant Construction Delay**

*AU0711121289 Prague RUDE PRAVO  
in Czech 4 Nov 89 p 2*

[CTK report: "A Meeting of Ministers Apropos the Construction of Mochovce"]

[Text] Mochovce—Evaluating the current situation and adopting measures to limit further delays in the construction of the nuclear power plant at Mochovce were the aims of Friday's [3 November] meeting of ministers from departments participating in building this power generating project. Pavel Bolvansky, member and secretary of the Communist Party of Slovakia Central Committee Presidium, participated in the discussions at Mochovce. Jan Siroky, head of a Communist Party of Czechoslovakia Central Committee department, and Ladislav Vodrazka, deputy CSSR premier entrusted with managing the CSSR Ministry of Metallurgy, Engineering, and the Electrotechnical Industry, were present.

So far, the delay in construction is estimated at 23 months. There are several reasons for this. However, the main reason is achieving sufficient application of the original design of the new, technically advanced, automated system for controlling technological processes. Delays have also been caused by adjustments in implementing a higher standard of anti-seismic measures and by insufficiently utilizing capacities regarding the construction and technological parts of the project. Lingering shortcomings in supplier-customer relations also play a significant role in the construction's regime not being fulfilled.

The meeting, in which Antonin Krumnikl, CSSR minister of fuels and power; Ivan Steis, Slovak Socialist Republic minister of construction and the building industry; and Jozef Keher, CSSR Government plenipotentiary for the construction of nuclear power plants, also discussed realistic possibilities of fulfilling the alternative deadline for bringing the first block into trial operation in September 1991.

## GERMAN DEMOCRATIC REPUBLIC

**Rheinsberg Nuclear Plant To Be Shut Down**

*LD0311140889 East Berlin ADN International Service  
in German 1306 GMT 3 Nov 89*

[Text] Berlin (ADN)—The oldest nuclear power station in service in the GDR, near Rheinsberg, will be shut down in the foreseeable future. Dr Hans Scheel, vice president of the State Office for Nuclear Safety and Radiation Protection, announced in an ADN interview that there are plans to undertake this step in the early 1990's. Initial agreements have been reached with the staff.

## POLAND

**Dockers May Strike Over Nuclear Parts Unloading**

*LD1611100989 Warsaw Domestic Service in Polish  
2100 GMT 15 Nov 89*

[Text] The Gdansk information agency, Solidarity, today informed the Polish Press Agency that at a plenary meeting of the regional temporary board of the Independent Self-Governing Trade Union (NSZZ) Solidarity, which was held 2 days earlier, a resolution was adopted, an appeal to Gdansk, Gdynia, and Szczecin dockers to refuse to unload nuclear reactors, destined for the power station in Zarnowiec.

Henryk (?Torbycki), the deputy director of Zarnowiec, said that the quickest possible unloading of the ship, whose stay in the port costs after all thousands of dollars, in no way prejudiced the matter of the installation of the reactors. That was dependent on a government decision on the future of the nuclear power station.

**Young People Protest Zarnowiec Nuclear Plant**

*LD2810054789 Warsaw PAP in English  
2206 GMT 27 Oct 89*

[Text] Gdansk, Oct. 27—Young people rallied here today to protest against the construction of a nuclear power plant in Zarnowiec, north-west of Gdansk.

The demonstration was held at the initiative of youth from the "Freedom and Peace" movement, "Anti-Atom Federation," "Fighting Solidarity," and "Federation of Fighting Youth."

## INTER-AMERICAN AFFAIRS

### Brazilian-Argentine Nuclear Agreement Signed

*PY1411161889 Madrid EFE in Spanish 0336 GMT  
11 Nov 89*

[Text] Brasilia, 10 Nov (EFE)—Brazil and Argentina have concluded negotiations on an accord under which 32 items produced by their respective nuclear industries will be tax-exempt, the Brazilian Foreign Ministry told EFE today.

The negotiations, which took place during the second meeting of the standing Brazilian-Argentine committee for nuclear policy, began on 6 November. The list of tax-exempt products includes incandescent lamps, air compressors, and laboratory equipment that can be used in the Atucha II (Argentina) and Angra II (Brazil) plants. The list, however, is not final because it will be analyzed by businessmen and official agencies of the two countries, who may introduce changes.

During a visit to Brazil by Argentine President Carlos Menem in August, the presidents of the two countries signed an annex to "Protocol 17" on nuclear cooperation, negotiations for which began under Raul Alfonsin. The annex establishes that the exchange of tax-exempt nuclear equipment between the two countries may reach \$15 million annually.

"Protocol 17" and five other agreements were signed by Brazilian President Jose Sarney and by then Argentine President Raul Alfonsin when the latter visited Brazil in October [words indistinct]. The cooperative process for promoting bilateral economic integration began in 1985 after a meeting between Sarney and Alfonsin in Foz de Igazu.

The current Argentine Government has attached particular importance to the integration process. President Menem's first official visit to Brazil reflected this political will to continue the process.

Both Brazil and Argentina have been under pressure because they are the only Latin American countries that have not signed the nuclear nonproliferation treaty. Considering their technological development, this attitude has caused suspicions that they might produce nuclear weapons. Brazil and Argentina have repeatedly stated that their nuclear development is for peaceful purposes.

## ARGENTINA

### Official on Arms to Pakistan, Condor Missile

*PY0211000689 Buenos Aires TELAM in Spanish 0008  
GMT 1 Nov 89*

[Text] Rosario, 31 Oct (TELAM)—Defense Production Secretary Miguel Cucchiatti announced today that "20,000 mortar fuzes are ready for shipment to Pakistan" and that a second lot of 40,000 fuzes will be

shipped in January. Cucchiatti made those remarks at Rosario's ammunition factory.

Cucchiatti talked to reporters during his inspection of the "Fray Luis Beltran" military factory, 20 km north of Rosario. Cucchiatti said the fuzes for Pakistan are for 81 and 120-mm mortars. He added, however, that they were manufactured at another factory.

Cucchiatti inspected the "Fray Luis Beltran" factory to ascertain the degree of worker professionalism and the quality of products from the assembly line, which include different caliber ammunition for military weapons (automatic rifles, machineguns, and pistols), sports weapons, and medium and heavy artillery.

Regarding the medium-weight Argentine tank (TAM), Cucchiatti said the government is discussing "selling it to an interested country to earn foreign currency for the nation," but he did not specify the country he was talking about.

Regarding the IA-63 Pampa plane, Cucchiatti said the government is talking with countries interested in purchasing the plane and countries interested in participating in its production, such as France and the United States. Cucchiatti recalled that U.S. technicians verified the plane's versatility and capacity for advanced pilot training.

Regarding the "Condor II," Cucchiatti said Argentina "will only sell it if it is used for peaceful purposes," and added that the missile remains in the experimental stage and that it is being built with Argentine human resources and technology, with the help of foreign capital.

### Menem Rules Out Nuclear Waste Dump in Chubut

*PY0811000089 Buenos Aires TELAM in Spanish  
1953 GMT 7 Nov 89*

[Text] Puerto Madryn, 7 Nov (TELAM)—Argentine President Carlos Menem has "absolutely" ruled out the possibility of building a nuclear waste dump site in the town of Gastre in Chubut Province.

The head of state briefly talked with journalists at the brand-new El Tehuelche Airport, shortly before returning to Buenos Aires.

Menem said that "this project" has aroused considerable criticism and now it "must be forgotten." This project involved the preparation of land near the town of Gastre to serve as a nuclear waste dump site.

**BRAZIL****Angra I Closed for Safety Reasons****Physicists Cite Dangers**

90WP0008A Sao Paulo O ESTADO DE SAO PAULO  
in Portuguese 14 Oct 89 p 18

[Text] Rio de Janeiro—Late yesterday afternoon Judge Salete Maria Polito Maccaloz of the Seventh Federal Court concurred with the request to shut down the Angra I nuclear power plant until steps are taken to correct a number of safety inadequacies uncovered in a survey made by physicists Luis Pinguelli Rosa and Anselmo Paschoa; this information was disclosed by attorney Marcelo Trindade of the Green Party [PV] (Rio de Janeiro). The judge assured the attorney that she would issue the formal decree on Monday.

The request to shut down that power plant stems from a petition submitted yesterday on behalf of the people by Fernando Gabeira, PV's candidate for the Presidency of the Republic, and State Deputy Carlos Minc. If the judge issues the formal decree, Furnas [Furnas Electric Power Plants, Inc] and Uniao will be enjoined to suspend operations at the plant. "It is a historic decision representing a death blow to the already weakened Brazilian-German Nuclear Accord," said Minc in anticipation of what might happen. Today at 1300 hours the PV is putting on a demonstration in front of the Angra I plant.

Ever since September 1986 the Federal Court has been pressuring to have a precautionary investigation made of Angra I; that investigation was finally completed in 1988. The report made by Pinguelli, expert from Union, and Paschoa, representing the ecologists, was available in April, but not until 20 days ago did the legal time limit run out. In the preliminary petition, signed by attorneys Bruno Lara Resende, Luiz Eduardo Correa, and Marcelo Trindade, it was requested that distribution of the report be made to those participating in the preliminary survey inasmuch as that report would allegedly contain the recommendations for action.

The security risks and inadequacies listed by the experts are the following: lack of technical and psychological training of the plant's operators, lack of a simulator to prepare the operators for emergency situations, and the nonexistence of a monitoring system with more informative displays. In examining the steam generator the experts discovered a "serious defect in the design and bad quality in the tubes making up that generator," causing serious corrosion problems.

With regard to the storage of highly radioactive rejects in areas where operators are working, it was pointed out that the pool is small and could contribute to the formation of a critical mass resulting in the initiation of the fission process as a chain reaction. Moreover, the pool cannot store rejects for more than 8 years and does

not have adequate protection. In addition, the report does not indicate where the rejects will be sent after cooling off in the pool.

With regard to rejects of low and medium radioactivity, an analysis should be made of the storage conditions inasmuch as the present site is in an area subject to landslides. According to the expert, Anselmo Paschoa, the primary-circuit sampling system does not contain the basic equipment required for adequate radiological protection; nor is the personnel trained to act rationally in the case of minor accidents. "Lastly, the report indicates that one of the most serious weaknesses in the general situation is the lack of a plan for evacuating the people residing in the proximity of the plant."

According to attorney Marcelo Trindade, in her communique Judge Solete Maccaloz will point out that "people tend to change their attitudes, betting on the improbability of events. Meanwhile, on the pretext of some priority, government officials are delaying programs and decisions which could obviate the hypothetical risk." In the face of a threat of "irreparable damage," a threat "already acknowledged by those same government officials," the judge decided only to grant the preliminary investigation. Trindade gave the press an unsigned draft of the communique in question.

**Political Motivations Scored**

90WP0008B Sao Paulo O ESTADO DE SAO PAULO  
in Portuguese 18 Oct 89 p 3

[Text] Brazilian society has had many doubts concerning the Angra I nuclear power plant, not only with regard to the cost of the project but also to its safety conditions which hopefully would permit the plant to be operated without danger to the area. The Brazilians are now beginning to come to a definite conclusion: Atomic energy does not mix with less weighty concepts, nor with ideology. In either of those mixtures the result could be the worst possible. At the beginning of this week the Electric Power Plants of Furnas, the firm responsible for operating the plant, received notice from the Seventh Federal Court that Angra I would be shut down until all the irregularities discovered in its operation were corrected.

The judicial decision was based on the investigative report of physicists Anselmo Paschoa and Luis Pinguelli Rosa who came to the conclusion that the plant is operating "under highly inadequate safety conditions" due to defects in the design of the steam generator, and the lack of proper training on the part of the technical staff involved in the plant operation. In addition, the plan for evacuating the area's residents in case of an accident is "ineffective." Based on that conclusion, members of the Green Party, including the candidate for the Presidency of the Republic, entered a plea on behalf of the people requesting that the plant be shut down; the plea was temporarily acted upon by the courts. On this subject, it is interesting to note that in February and March of this year the International Atomic Energy



Agency [IAEA]—which has without interruption pressured Brazil to sign an accord calling for the nonproliferation of nuclear weapons—made a thorough on-site investigation of the Angra I plant without discovering any serious problem or threat to the safety of the operation or the area's residents.

This visit by the IAEA technicians was the second international inspection of the plant; the recommendations made after the first visit 4 years ago "were 90 percent carried out" and the subsequent report, according to Furnas, states that the level of training of the plant's personnel "surpasses the international average." There is no doubt that there should be only one criterion applicable to the operating conditions of a nuclear reactor, principally with regard to safety. That being the case, one of the two findings must have been in error in connection with this safety criterion.

This is not the first time that the findings of physicist Pinguelli Rosa—noted critic of the Brazilian nuclear program—have given rise to judicial decisions, after verification, prohibiting operation of the plant. However, this time, there is reason to be concerned inasmuch as the two conclusions regarding the safety criterion were based on evaluations made within a relatively short time. IAEA has vast experience in the evaluation of safety conditions in nuclear power plants; and, in that case, could there have been some deplorable error in the commitment made with regard to the operation of Angra I? Or, if not, could we be faced with the first example of an electoral evaluation of the safety conditions of a nuclear power plant? Or have we arrived at the time of the ideological atom?

After 17 years of repeated technical interruptions and reparations, it is important to note that the plant finally began to function with an annual availability factor of 90 percent—an excellent international index—and that, when operating at full capacity as occurred in July of this year, it was capable of supplying the power requirements of Rio de Janeiro. It would be interesting to know how many of the Green Party's meetings and nocturnal sessions were illuminated by power from Angra I. But on the eve of a presidential election, a technical criterion can be transformed into an excellent electoral debate. And along that line and at this moment, it is even worthwhile to oppose the installation of a nuclear reactor for the Navy, in Sorocaba, in complete agreement with all those who, in the First World, do not accept or even discuss Brazil's right to trace its own path of technological independence in this ultrasensitive area of research. Undoubtedly a very strange alliance between the greens of one side or the other, which appears greater than the discrepancy between the IAEA technicians and the Brazilian physicists.

#### **Nuclear Accord with FRG To Be Renewed**

##### **DER SPIEGEL Report**

90WP0007A *Sao Paulo O ESTADO DE SAO PAULO*  
in Portuguese 19 Oct 89 p 19

[Text] The government of the West Germany has already decided to extend its nuclear cooperation agreement

with Brazil; the 5-year term of the present agreement lapses in November. Signed in July 1975, the agreement is considered to be a good business arrangement for the West German Government. This information appeared in the latest edition of the German magazine, DER SPIEGEL. The issue confirms that Chancellor Helmut Kohl is trying to convince a group of deputies of the Social Democratic Party and the Green Party who are demanding an end to the agreement that nuclear energy is essential for Brazil, since the utilization of hydroelectric power would involve the flooding and destruction of too great an area of the Amazon basin.

This argument, however, is really just camouflage, according to DER SPIEGEL. The West German Government, according to the magazine, is really interested in renewing the agreement because many West German plants involved in supplying equipment to Brazil are reluctant to continue doing so; this is because of the economic crisis in Brazil, which has slowed the Brazilian nuclear program, and also because Brazil is developing a parallel program that is clearly military in nature.

The West German Government's interests have encountered resistance from the Greens and from a faction within the Social Democrats, both of whom are concerned over the proliferation of nuclear arms. So, at the same time that West Germany is negotiating a renewal of the agreement with Brazil, it is seeking guarantees that its participation in the Brazilian program involve strictly peaceful ends. According to DER SPIEGEL, the West German information service warned the government in 1987 that "the parallel program is unquestionably aimed at military goals." The magazine says that Brazil is doing everything possible to block the international controls called for in the agreement. West Germany and Brazil agreed to advise the International Atomic Energy Agency (IAEA) of an kind of transfer of technology or equipment, but only West Germany is complying. Brazil either provides no information at all, or does so after long delays.

Now, with 18 November approaching, Bonn announced that it had convinced Brazil to renew the agreement. But the Brazilian parallel nuclear program worries the West Germans. Quoting West German Government members, the magazine says that there is a "subjective danger of a loss of international trust with regard to the exclusively peaceful nature of the West German-Brazilian cooperation."

In the view of the West German Government, there is no doubt that Brazil is interested mainly in blocking the entry of international monitors to the parallel program, and that it is to this end that "they (the Brazilians) devote their greatest efforts."

##### **Safeguard Conditions Met**

90WP0007B *Sao Paulo O ESTADO DE SAO PAULO*  
in Portuguese 19 Oct 89 p 19

[Text] According to the National Nuclear Energy Commission (CNEN), the safeguards agreement between

Brazil, West Germany, and the International Atomic Energy Agency (IAEA), which has been in effect since 1976, is not only formally observed by Brazil; every 2 months all equipment, information, and nuclear materials are checked by the three parties, either in Brazil or in West Germany. "There is no way to avoid notifying IAEA," says nuclear engineer Marco Marzo of CNEN, who is responsible in Brazil for the Safeguards Department of the agreement. According to him, even equipment that is not in use undergoes close monitoring. Everything shipped from West Germany is controlled by the agency, and, when it arrives, it is checked on site by the agency, explains Marzo. "The system is the safest possible; even the screwdrivers are examined," says the engineer. The text of the safeguards agreement, which is a control system for materials, equipment, installations, and transfer of technology, was approved in February 1976 by a board of governors that includes all countries that supply nuclear equipment; the approval represents a kind of endorsement of the Brazil-West Germany treaty by the international community.

Under its rules, the safeguard agreement is able to detect any displacement of nuclear material, whether in Brazil or West Germany. In order to guarantee that technology transfer complies with solely peaceful ends, the safeguard agreement contains the following provisions:

- Affirmation of the principle of nonproliferation of nuclear arms;
- An obligation not to manufacture nuclear arms or explosives, and not to use nuclear materials for military ends;
- An obligation to extend the safeguards to cover exportation to third countries, even in the case of nuclear powers;
- A commitment to provide physical protection for equipment, installations and nuclear materials so as to prevent the interference of third parties involving sabotage or theft of materials.

#### **Embassy Confirms Renewal**

*PY3010214389 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 29 Oct 89 p 18*

[By Rubens Santos]

[Text] Brasilia—The contract with the FRG Government for the supply of equipment following the construction of the Angra II and Angra III nuclear plants will run for 5 more years. This information was confirmed yesterday in a letter to the media by Jurgen Bandel, minister counselor of the FRG Embassy in Brasilia. Brandel said that the continuation of the Brazilian-FRG nuclear agreement was ratified by the FRG parliament at the initiative of the government parties. The FRG cabinet has also ratified the agreement.

The contract was signed on 27 June 1975. It includes the possibility of being revoked on 18 November 1989 if not previously ratified. If no claim were made up to a year before the expiration date, the agreement would be

maintained for another 5 years, which is the contractual term for renewal. Over the past few months, members of the FRG Green Party have tried to challenge the agreement. The group presented evidence that Brazil was not complying with some measures imposed by the International Atomic Energy Authority (IAEA), which establishes standards for nuclear cooperation exclusively for peaceful purposes.

#### **Details of Secret Army Graphite Reactor Disclosed**

*PY2710125889 Sao Paulo FOLHA DE SAO PAULO in Portuguese 24 Oct 89 p A-6*

[By Tainia Malheiros]

[Excerpt] The Army Technological Center [Centro Tecnológico do Exército—CETEX], in Guaratiba (west of Rio de Janeiro), has begun building an experimental reactor, according to the information obtained by FOLHA. The TECMAT [expansion unknown] enterprise was set up on the President Dutra highway, in Nova Iguaçu (Baixada Fluminense, 30 km from Rio) approximately 2 years ago with the support of CETEX to produce the graphite bars necessary for the reactor. Plutonium can be obtained from graphite reactors, and after being recycled can be used to make atomic bombs. The National Commission for Nuclear Energy (CNEN) is participating in the CETEX project, which started 8 years ago and which was being kept secret.

TECMAT President Antonio Carlos Didier Barbosa Vianna, who is a 65-year-old Navy reserve officer, yesterday said that the reactor is still just a project and that its construction should be completed within the next 5 years. He said that the first graphite bars were delivered to CETEX in March and April 1968. In 1962 Didier headed the project and the construction of the Argonauta research reactor, which used 93 percent national technology. He said that at that time Brazil had to import graphite from France and uranium from the United States. He then added: "We still have some, and we are no longer dependent."

About 8 years ago CNEN decided that the Navy was to be responsible for the uranium enrichment project that is being developed by the Experimental Center in Aramar, in Ipero (125 km west of Sao Paulo). Didier said that at that time the CNEN "decided it was better" to make CETEX responsible for the technology to obtain graphite. According to him, CETEX built the pilot plant and supplied the basic technological information for the establishment of TECMAT. The enterprise uses an area of approximately 40,000 square meters and the constructed area occupies 11,000 square meters.

Didier added that when it was disclosed that the Navy had mastered uranium enrichment technology 2 years ago, exports to Brazil of any nuclear material were blocked. Didier explained that "we no longer received supplies of the anode (positive electrode) graphite bars used to conduct electricity to heat the hexafluoride

[hexafluotero] (uranium in gaseous form) compartment." He added that TECMAT this year tested the first graphite bars approved by CETEX and asserted that "the final touches are being made." [passage omitted]

### **Arianespace Assures Liquid Fuel Technology**

90ET0003A Sao Paulo GAZETA MERCANTIL  
in Portuguese 23-25 Sep 89 p 16

[Article by Veronica Couto]

[Text] Rio de Janeiro—The director general for international affairs of the European consortium Arianespace, Klaus Iserland, was in Brazil last week to work out the details of the technological transfer program to be implemented in the event that this enterprise is chosen by Telebras [Brazilian Telecommunications, Inc.] to supply the rocket launchers for the next Brasilsat communications satellites, numbers 4 and 5. The decision to establish a technological agreement with Brazil, which was made about 15 days ago by French President Francois Mitterrand, went against pressures from the United States which did, on the other hand, lead to the withdrawal from the bidding of German, Italian, and English businesses, which are minority partners of Arianespace, according to sources at the consortium itself.

The United States challenged the plans for the transfer of French technology, which included support for Brazilian training in the production of space vehicles using liquid fuel propulsion systems, based on the treaty on nonproliferation of ballistic missiles signed by the seven great powers (Germany, Italy, England, the United States, France, Spain, and Japan), which forbids the supply of what is termed "sensitive technology" outside the boundaries of the signatory countries. The participants in the Arianespace consortium include France, which has 60 percent of the shares, and Germany, which has 20 percent, while the balance is distributed among England, Italy, Switzerland, and Belgium.

Iserland stated at a press conference held in Rio on Friday that he is concerned about the delay in the announcement by Telebras of the decision on the bids for the purchase of rocket launchers, which was scheduled for last June. He said that the change in the time periods for the project may compromise not only Brazil's telecommunications capacity (with the expiration of the satellites in orbit, Brasilsat 1 and 2), but also the conditions for technological development between the two countries.

"The preparations for this bidding competition have already taken a year and a half; the construction of the satellites requires 3 more years; and 6 additional months are needed to obtain the launchers," Jacques Louis

Mercier, the director of Montemer International, which represents Arianespace in Brazil, explained. He warned that the useful life of the satellites now in operation will come to an end in 1993 and 1995.

The transfer of technology, one of the requirements in the specifications, would be effected by Arianespace, in conjunction with the Aerospace Technology Center (CTA), covering the development of the Brazilian launching vehicle, which uses solid fuel and is already well-advanced, and also the free launching of scientific satellites of up to 50 kg.

The most important aspect, however, is the "know-how" for liquid fuel propulsion systems, which make it possible to launch more powerful satellites, such as the SO communications type, which carry 4.5 tons to up to 36,000 km away from earth. The solid fuel propulsion launcher which Brazil is planning at the CTA, for example, carries a weight of 200 kg and has a range of only 1,000 km. In order to be able to produce its own rocket for the number 5 and 6 communications satellites by the year 2000, Brazil needs to make an investment estimated at about \$500 million, Iserland said.

### **Arianespace Wins Bidding on Brasilsat Launches**

PY0611173889 Sao Paulo O ESTADO DE SAO PAULO

in Portuguese 5 Nov 89 Economic Section p 9

[Text] According to the EMBRATEL [Brazilian Telecommunications Company] public bidding commission's final report, the new Brasilsat system satellites will be launched by Ariane rockets, which are produced by the European consortium Arianespace. The selection was made in bidding separate from the process that selected the U.S. firm Hughes to supply the satellites. The Ariane rocket defeated the McDonnell Douglas Delta-II rocket.

The cost of a launch is proportional to the satellite's weight. The result of the bidding, not taking into account the launch cost or the interests involved in financing the entire project, was as follows: Hughes, \$172 million; a consortium headed by the Canadian firm Spar, \$225 million. The difference, therefore, was \$53 million.

If financing interests are included, the price of the Hughes satellite was \$404 million and the Spar was \$508 million, for a difference of \$104 million. If the weights were included the Spar satellites would cost \$130 million more, because they are heavier than the Hughes version.

The Ariane will begin launching the Brazilian satellites in 1993 to replace the present Brasilsat A-1 and A-2. Arianespace will be declared the bid winner when the results of the satellite bidding are announced.

## EGYPT

## Reaction to Israeli-South Africa Nuclear Connection

## Cooperation Decried

NC0111230089 *Cairo Domestic Service in Arabic*  
1240 GMT 1 Nov 89

[Ibrahim Wahbi commentary: "What Will the Big Powers Responsible for Peace Do Regarding Israeli Nuclear Activities?"]

[Text] The cooperation between Israel and South Africa is not a new or surprising story. Both countries are in similar circumstances, adhere to racist policies, consider the original people second-class citizens, ignore the United Nations and its resolutions, and use brutal means to quell liberation movements. Moreover, Israel and South Africa have established a ring of hostilities around them fanned by their illegal behavior violating international law. Thus, it was only natural that Israel and South Africa should cooperate in all spheres, particularly in the most dangerous, the nuclear area.

The two countries constitute an axis for the production of nuclear arms and fighter aircraft based on U.S. technology. Israel is providing South Africa with this technology in return for concentrated uranium from Pretoria. Israel refused to sign the treaty on non-proliferation of nuclear weapons. It also refused more than once to allow UN and U.S. experts to inspect its nuclear plant in Dimona. The latest incidence of Israeli involvement in missiles carrying nuclear warheads was announced by the Soviet Union, which said that Israel fired a test missile with a 1,600-km range in the Mediterranean.

Despite these public reports, the big powers responsible for world peace refuse to rivet attention on the Israeli position. This comes at a time when the two superpowers agree on reducing nuclear arms, eliminating medium-range missiles, and forging ahead with their plans for disarmament or arms limitation.

In fact, we see no reason or justification for worry or fear from rumors about the likelihood that Pakistan possess nuclear arms. We indeed see no interest in the facts regarding Israel's definite nuclear danger. The capabilities for making atomic weapons are now within the reach of many countries. Control of this potential would be difficult and even impossible, particularly if a certain country were allowed to possess this type of weapon, because every action has a reaction. Any state insisting on defying the world and possessing nuclear arms and threatening others would be met by similar insistence by its neighboring countries.

Undoubtedly, the international nuclear nonproliferation treaty will be useless if certain countries are shown forbearance in possessing such arms. Israel is persisting in defying world peace and security in its attempts to

possess nuclear arms. A few years ago, the United States caught certain Israeli agents in the United States trying to smuggle nuclear technology to Israel.

What is required now is not to release warning statements to Israel about continuing this nuclear course. We demand that the international community, the United Nations, and the big powers insist on placing the Israeli atomic reactors, particularly those in Dimona, under vigilant supervision and inspection. We believe that the Pretoria-Tel Aviv axis must motivate the Arabs and Africans to close their ranks further to confront this hazard.

It remains to be said that nuclear arms and atomic bombs may be fit for wars, but liberation movements, people's struggle, and popular will cannot be confronted by this type of weapon, because they have nothing to do with conventional security theories. By its nuclear plans, Israel is destroying the hope for peace and is arousing world-wide worry. Even the closest friends of Israel are not concealing their annoyance over this behavior. (Henry Skoltky), assistant deputy under secretary for the nonproliferation of nuclear arms affairs in the national security office in the Pentagon, [title, office as heard] said before a congressional committee that the Israeli liaison with South Africa is a serious matter for the highest echelons in the Pentagon and that such cooperation is not in the interest of anyone's security. The question posed now is what the big powers that are responsible for peace will do regarding this danger.

## Government Contacts Israel

NC0111230889 *Cairo MENA in Arabic* 1400 GMT  
1 Nov 89

[Text] Cairo, 1 Nov (MENA)—Egypt has expressed its concern over international media reports that have been confirmed by official U.S. sources on cooperation between Israel and South Africa on developing missiles capable of carrying nuclear warheads. The Foreign Ministry today contacted Israeli ambassador in Cairo Shim'on Shamir and underlined Egypt's concern over these reports. It said that Israeli cooperation with South Africa constitutes a threat to African countries and the Middle East. This cooperation contradicts international efforts in general and those of the United States and the Soviet Union in particular in halting the production of this type of missile, destroying the stocks, and preventing the proliferation of warheads. An official source in the Foreign Ministry has stated that Egypt had earlier requested Israel sign the nuclear nonproliferation treaty.

## U.S. Reaction Viewed

JN011175689 *Cairo AL-AHRAM in Arabic*  
30 Oct 89 p 16

[Untitled article by Ahmad Baha' al-Din carried within the "Diary" column]

[Text] In its issue yesterday, AL-AHRAM published a dispatch from the head of its Washington bureau Hamdi

Fu'ad that President George Bush has asked for a comprehensive reassessment of U.S. policy and stands on the deployment of nuclear weapons and their technology. This is after the exposure of Israel's cooperation with South Africa on the production of nuclear weapons and a fighter plane based on U.S. technology in exchange for enriched uranium from Pretoria. At a news conference yesterday, the U.S. President said that if the reports on the nuclear cooperation between Israel and South Africa prove to be true, relations between the United States and Israel will become complicated. He stressed that Washington vehemently opposes the transfer of such technology to a third country. A U.S. State Department spokesman said that President Bush's administration is following up the situation and will suspend the export of the technology dealing with missiles to a specific country when it fully ascertains that this country is transferring it to a third country. The U.S. spokesman said: We have voiced our concern to Israel over the issue of the transfer and deployment of these weapons. Officials are greatly concerned about the possibility of Israel's obtaining a U.S. super computer that is used for developing military research out of fear that it may use it to produce hydrogen bombs and leak its secrets to South Africa.

I believe that President Bush is truly concerned about this although I am surprised that he does not know about the 15-year-old secret. I understand President Bush's concern about the transfer of U.S. secrets to third parties in view of the impact this may have on many U.S. stands on the international level. However, the transfer of this U.S. technology only to Israel with a guarantee that it will not be leaked to a third party, has been an inconvenience to us, the Arabs. These weapons in Israel, which is not a third party, knock only at our doors, are a source of threat to us alone, and raise a hue and cry against the United States only in our region where every individual wonders in exchange for what have these things been leaked only to Israel, which is daily rejecting a U.S. initiative, idea, or advice in one form or the other?

I do not know why Israel is worried about the concern voiced by the United States, which only uses the weapon of "concern" against it, a weapon which is so ineffective.

#### **Nuclear Agency Chairman Complains of Program Progress**

90WP0006A Cairo MAYU in Arabic 25 Sep 89 p 4

[Article by 'Abd-al-Nasir 'Abd-al-Zahir: "International Pressures Stop Egypt and Arabs From Entering Nuclear Energy Field"]

[Excerpts] [Passage omitted]

The International Atomic Energy Commission [IAEC] in Vienna has instituted a comprehensive program for the utilization of nuclear power plants in developing countries, since its scientists have determined that there is no alternative to the Third World going into the nuclear

energy field. The agency has selected an Egyptian scientist, Dr 'Ali al-Sa'idi, president of the Nuclear Plants Authority in the Ministry of Electricity to manage this program. [passage omitted]

Dr 'Ali al-Sa'idi said, "We used," stressing the word used, "to have an Egyptian nuclear program, but now we do not have any vision, nor do we know what needs to be done with regard to this vital issue. This, unfortunately, is not only on the Egyptian level but on the Arab level as well. There is no coordination of planning regarding nuclear energy at any level. As for the Egyptian program, we had planned to have eight 1000-megawatt nuclear plants before the year 2000 wherein nuclear energy would meet 40 percent of Egypt's electric power needs."

I interrupted Dr 'Ali al-Sa'idi to ask him what steps had been taken, but he in turn interrupted me, saying: "Nothing. We have spent a long time on studies and statistics but have not realized any practical steps, even though this matter has been debated by the People's Assembly and the Shura Council Energy Commission that includes in its membership highly respected professors in all fields of specialization. A few years ago the commission recommended the immediate implementation of the Egyptian nuclear program so that we would not lag behind, as usual, and that we may acquire this important modern technology. Nonetheless, we are still waiting for the political decision to begin implementation now that the experts have had their say." [passage omitted]

#### **Economic Circumstances**

I tried very hard to elicit a convincing reply to my question about the delay in implementing the Egyptian nuclear program, so I offered my own answer by saying that perhaps the economic circumstances do not permit us to do so, at least for the time being. But he quickly interrupted me, saying: "Economic circumstances will turn against us if we fall behind, and the more we fall behind, the more complicated the economic aspect will be. Conversely, it would be cheaper for us to build the first 1000-megawatt plant in al-Dab'ah which is 160 kms from Alexandria. Moreover, given the growing cost of conventional electric power generation and dwindling conventional sources, it is very economical to use nuclear plants to generate power. Therefore, many Third World countries that began their nuclear planning after we did, like India and Pakistan, have actually gone into this field. Indeed, Israel this year began construction on the first nuclear power plant near the 'Awjah way station. This should remove any fear of pollution we may have, because the al-Dab'ah station is farther away from Cairo than the 'Awjah plant, over which we have no control, and part of which may be used for military purposes."

#### **Candor**

Dr 'Ali al-Sa'idi went on to say that Egypt and the Arabs are coming under international pressure aimed at preventing them from entering the nuclear energy field.

Such pressures are in the form of intimidation, at times using the pretext of radioactive pollution, and at other times the economic situation. Therefore, we must dispel this fear so as not to succumb to international pressures.

Moreover, we must join all the Arab countries in drawing up a future plan for the acquisition of nuclear technology and a speedy entry into the nuclear energy age because we can no longer afford to wait or delay. This is especially true now that we have the human and economic capabilities and, indeed, the nuclear fuel (uranium ore), which has been discovered in Egyptian and Arab deserts in large quantities. More serious than that is the fact that international circumstances make it incumbent upon us to enter the nuclear energy age.

### Other Agencies

We have another agency specialized in the exploration of radioactive elements, including uranium which is used to operate nuclear reactors. It is the Nuclear Element Agency which comes under the Ministry of Electricity and is headed by Dr Husayn 'Abd-al-Muhsin, who is one of the scientists of the IAEA used to manage uranium exploration projects in several African countries. He spent 5 years on loan to the agency and also serves as an advisor to the agency in his field of specialization, which is exploration for uranium. I asked him the same questions I asked Dr al-Sa'idi and he gave me pretty much the same answers and with the same degree of emotion. But he added one bit of information that he had 250 researchers, some of whom have masters and doctorate degrees, exploring for uranium, and who are distributed among six expeditions covering the Egyptian deserts. So far, they have discovered large quantities of the fuel of the future, uranium, in the Egyptian deserts, but they have not gone into production, waiting for the long-awaited political decision.

I asked Engineer Mahir Abazah, minister of electricity and energy, more than once about the suspension of the Egyptian nuclear program, and he said that it has not been suspended, but rather modified. This is an important and serious topic that concerns the entire Egyptian population. Therefore, the "awaited" decision is that of the people and the government, and not of the Ministry of Electricity alone. This subject has been discussed at length in the People's Assembly and the Shura Council, and we are waiting for the go-ahead signal to begin using nuclear power plants at once.

### Abu-Shinaf on Israeli Satellites, Nuclear Power

*JN0511212489 Cairo AL-MUSAWWAR in Arabic  
3 Nov 89 pp 12, 13*

[Interview with Lieutenant General Safiy-al-Din Abu-Shinaf, Egyptian chief of staff, by Sana' al-Sa'id; date and place not given]

[Excerpts] AL-MUSAWWAR: Israel is developing two new satellites for spying and collecting information, in addition to the satellite it launched over a year ago in

September 1988. What is our stand as Egyptians and Arabs toward this? If we and the Arab countries possess the technology and if the Arab countries possess the necessary funds, why do we desist from entering this vital sphere?

Abu-Shinaf: Satellites were developed in the fifties and sixties, and they are not something new. Outer space contains more than 3,000 satellites launched by the East and West. They have different orbits and ranges. Some of them are used for communications and research, while others are known as military satellites which orbit the earth at low altitudes of 250-400 km. These are provided with precise equipment for various types of photography. This, however, is not enough, because the country possessing satellites should be able to penetrate all the means of communication of the state over which the satellite is orbiting before it can analyze and understand the meaning of what the satellites are photographing; otherwise, they would be useless. The best proof on this is what we achieved in the October 1973 war in spite of the existence of about 3,000 satellites in space at that time. [passage omitted]

AL-MUSAWWAR: Can satellites pose a real danger to the Armed Forces?

Abu-Shinaf: Satellites do not pose a real threat to the Armed Forces, and their merits can be countered by concealment and camouflage on the strategic level, in addition to other methods which we know and master, but cannot discuss here.

Back to the subject of the Israeli satellites, I would like to say that Israel's entrance into this sphere was not a surprise to us, because we are following up the Israeli programs as well as the international programs and researches in this sphere. The technology of building satellites is within easy reach of Arab scientists, particularly the Egyptians. The same applies to the technology of launching satellites. Restrictions lie only in the finances and expenditure priorities according to the country's needs. There is no doubt that Arab cooperation is a hope which will overcome many of the difficulties facing us in this regard, and which will make us cope with this development, whether on the regional or international levels.

AL-MUSAWWAR: Taking into account the nature of the Israeli nuclear program, which poses a threat to the Arabs, and Israel's continuous refusal to join the Nuclear Non-Proliferation Treaty or to apply the comprehensive guarantees stipulated by the International Atomic Energy Agency to its nuclear facilities, I wonder: Doesn't this increase concerns over the nature and objectives of the Israeli nuclear program? Don't Israeli nuclear arms raise Egypt's concerns, especially since they have approximately 200 nuclear warheads?

Abu-Shinaf: I do not believe that Israel possesses this number of nuclear warheads. The exaggeration of Israel's possession of nuclear warheads must not lead us to heightening the threat to the Middle East region posed

by nuclear arms. There have been several conflicts since the first atomic bomb was dropped on Hiroshima in 1945 until now, after more than 44 years. However, none of these states, including the big powers, has resorted to the nuclear option. This is because the brutality of confrontations has imposed restrictions on the use of nuclear arms. This has been to the advantage of mankind.

The world now is proceeding toward rejecting nuclear options to settle problems. As a nonaligned state, we have stressed this at the ninth nonaligned summit which was recently held in Belgrade. We have also blessed the two superpowers' steps regarding the limitation of nuclear arms and the reduction of conventional military forces by both the Warsaw Pact and NATO. The future world is looking forward to settling regional conflicts. This approach is currently being adopted by the two superpowers. The region's states should exploit international detente in construction and development, and not in arms races and wars. Worry springs from the fact that the use of nuclear arms will also bring catastrophes to the side that will use them. We should learn a lesson from the Chernobyl incident in the USSR. West Europe was affected by this incident although it is thousands of miles from it. There are also several regions that are still suffering from this incident. [passage omitted]

#### **Atomic Energy Chairman Reports Results of IAEA Conference**

51004601 Cairo *AL-AHRAM* in Arabic 13 Oct 89 p 8

[Report by Mahmud al-Qanawati]

[Text] The UN has agreed to an Egyptian request put before the International Atomic Energy Agency [IAEA] to finance construction of a nuclear cyclotron with approximately 5 million Egyptian pounds. It will be the first of its kind in Egypt, shifting the Egyptian Atomic Energy Authority from low-energy to high-energy research so that its research might be competitive on international levels.

This came about during meetings of the IAEA general conference in Vienna, in which Egypt and the Arab group criticized Israel and South Africa for experiments introducing nuclear weapons into the Middle East and Africa.

Upon his return, Dr Hamid Rushdi al-Qadi, chairman of the Egyptian Atomic Energy Authority, stated that—affirming Egypt's central leadership [role] in Africa and President Husni Mubarak's chairmanship of the OAU—he held meetings with a group of African countries to decide on a UN-supported program for peaceful uses of atomic energy on the continent. Work will begin on this next year.

He added that he held several sessions with a group of Arab countries to coordinate cooperation among them and unify their policies on the draft proposals that had

been made, the most important of which are condemnation of the spread of nuclear weapons in the region and burial of nuclear waste.

### **INDIA**

#### **Nation's Stand on Nonproliferation Treaty Examined**

##### **Article by Specialist**

51500017 Madras *THE HINDU* in English  
28 Sep 89 p 8

[Text] In less than a year from now, the Treaty on the Non-Proliferation of Nuclear Weapons—the NPT as it is commonly referred to—will have been in force for two decades. Upon the entry into force of the treaty, U Thant, the then Secretary General of the United Nations, said, "It is my very firm belief that it is in the interests of the world community that the Non-Proliferation Treaty should command universal respect." Efforts to achieve this goal—the universality of the treaty—have continued to this day as was witnessed only recently when the Prime Minister of Australia, Mr Bob Hawke, a good friend of India, expressed the hope that India would accede to the treaty. It might, therefore, be useful and timely to take stock of the situation and see whether there have been any changes or developments that would warrant a reappraisal of India's strong and principled stand against the treaty and its considered decision not to be a party to it.

To begin with, it would be useful and pertinent to recall that, far from opposing the concept of non-proliferation of nuclear weapons, it was upon India's initiative that the United Nations had on its agenda an item relating to the non-proliferation of nuclear weapons. In 1964, India asked for the inscription on the agenda of the 19th regular session of the United Nations General Assembly an item specifically entitled "Non-Proliferation of Nuclear Weapons." India believed that this would help bring about a radical but necessary departure from the nature of earlier discussions, based on an Irish initiative, which had focussed on the necessity of avoiding the spread or dissemination of nuclear weapons.

#### **Correct Approach**

Our approach had been based on the correct premise that both the spread and the further accumulation and development—the horizontal as well as vertical proliferation—of nuclear weapons, being integral parts of the same problem, had to be dealt with as a whole if there was to be any success in the area of nuclear disarmament. This meaningful and correct approach was welcomed by many although the superpowers and their entourage continued to think and act only in the direction of preventing the spread of nuclear weapons. India refused to compromise on this basic issue and got the United Nations General Assembly, in Resolution 2028(XX) adopted in 1965, to declare that "the treaty



should embody an acceptable balance of mutual responsibilities and obligations of the nuclear and non-nuclear powers" and, furthermore, that "the treaty should be a step towards the achievement of general and complete disarmament and, more particularly, nuclear disarmament." Thus there was no doubt whatsoever at that time that what the General Assembly had asked the Geneva negotiating body—the 18-nation Disarmament Committee—was to come up with a treaty covering both the horizontal and vertical aspects of the proliferation of nuclear weapons.

In Geneva, India along with other like-minded countries, tried hard to respond fully and conform accurately to the mandate of the United Nations General Assembly. Unfortunately, it failed in this attempt and the treaty, concluded in 1968 and "commended"—note that it was not "approved" or even "endorsed"—by the General Assembly in June 1968, deliberately sought to alter the concept completely and it dealt almost exclusively with the horizontal aspect. In fact, it should have been termed the "treaty on the non-dissemination of nuclear weapons." Even the cryptic and brief reference to vertical non-proliferation in Article VI, by which the parties to the treaty undertook "to pursue negotiations in good faith on effective measures relating to the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control," was inserted at the last minute and with much difficulty.

### Unequal Treaty

India and several other important countries refused to accede to the treaty in spite of severe pressures from both the superpowers. India realized, as Prime Minister Indira Gandhi stated in the Lok Sabha in April 1968, that "not signing the treaty may bring the nation many difficulties"—as indeed happened in the case of the supply of fuel for the Tarapur nuclear power station—but we were not prepared to compromise. At the same time, India did not campaign against the treaty as it felt that it was for others to decide for themselves whether to become parties to it or not.

The objection to the treaty was two-fold. First, India believed that the treaty, as it finally emerged, was unequal as, contrary to the nuclear mandate given by the General Assembly that the treaty should "embody an acceptable balance of mutual responsibilities and obligations of the nuclear and non-nuclear powers," there was no such balance in the treaty. While providing elaborate measures for achieving horizontal non-proliferation, it was almost totally silent on what to many of us was the more important issue, namely, vertical proliferation, the nuclear arms race. Secondly, the treaty was highly discriminatory in many ways. To give but one example, it stipulated that non-nuclear powers should enter into binding agreements with the International Atomic Energy Agency, through which the agency would impose

full scope safeguards on all their peaceful nuclear activities through elaborate inspection and verification procedures. The nuclear weapon powers were excused from any such safeguards arrangements and were left free to continue increasing their nuclear weapon stockpiles and to continue with their weapon research and development aimed at making these weapons more sophisticated and thus more destructive.

The unstable and fragile nature of the Non-Proliferation Treaty became obvious very soon after it came into force. Even before the treaty was ratified by the required number of parties and came into force, several non-nuclear weapon powers, parties to the treaty, were giving expression to their dissatisfaction with its various aspects—particularly the non-implementation of the commitment, however weak and modest, to agree on a measure of nuclear disarmament (Article VI) as a counterbalance to the obligation which the non-nuclear powers were required to assume.

### No Worthwhile Conclusions

The first review conference, held in 1975, was itself a disaster. Most of the countries, parties to the treaty, which attended the conference, were thoroughly disillusioned with the results and some even spoke of withdrawing from the treaty. No worthwhile conclusions were reached. All attempts to rectify the serious shortcomings of the treaty, particularly in Articles IV and VI, were thwarted by the intransigence of the nuclear weapon states. Several states, while reluctantly accepting the insipid and meaningless consensus thrust upon them, made interpretative statements contradictory to the sense of the consensus and some of them even objected outright to some of the formulations in the text.

The second review conference, held five years later, in 1980, fared even worse in that it was not possible even to produce a consensus document. Again, the most intense, and at times almost explosive, statements were on the non-implementation of Article VI. Some states, which had signed the treaty in the fond hope of benefiting from the seemingly promotional provisions of Article IV, were extremely critical of the restrictive export policies on the part of the suppliers of nuclear equipment and technology. But the issue that wrecked the conference was the fundamental difference on Article VI relating to nuclear disarmament.

The third review conference in 1985 fared no better though it did produce a weak and innocuous document. If one were to study the records of the three review conferences which have been held so far, one would easily come to the conclusion that a clear division has emerged between, on the one hand, those who regarded the treaty as an arms limitation agreement solely designed to prevent the further spread of nuclear weapons to countries which did not possess them, who felt that, on the whole, the treaty had worked well and those who, in conformity with the mandate given by the General Assembly, had expected a treaty with a balanced



and non-discriminatory approach, but were thoroughly disillusioned. This gap in perceptions and expectations still exists.

The next review conference is due to be held in 1990. Considerable importance is attached to it because, being the penultimate one in the present lifetime of the treaty, the future of the treaty will depend to a great extent on the outcome of the conference.

#### Historic Accord

The agreement on the elimination of land-based intermediate-range nuclear missiles, concluded in Washington on December 8, 1987 between the U. S. President, Mr Reagan, and the Soviet General Secretary, Mr Gorbachev, was the first nuclear reduction agreement the world has witnessed and its historic importance and significance should not be underrated. Admittedly, it envisaged only a modest reduction in the existing nuclear arsenals of the superpowers and as such should not be considered, as the Prime Minister stated in Parliament on December 9, 1987 "as more than a beginning—a historic beginning, a vital beginning but still only a beginning."

However, the importance of the INF agreement is really not in its substantive details. The agreement is significant since (again to quote the Prime Minister) "it is also the first time that the U. S. and the Soviet Union have agreed to eliminate completely an entire category of nuclear weapons." After the conclusion of the INF agreement, it was hoped that the momentum provided by it and the expressed desire even on the part of several Western European countries for the elimination of short range missiles from Europe would provide the necessary impetus for further nuclear disarmament measures. This did not materialize and many believed that the change in administration in the U. S. and the teething period for the new President, Mr Bush, had come in the way of any meaningful follow-up of the INF agreement. But the news from the mountain lodge overlooking Jackson Lake at the end of the day long session between the U. S. Secretary of State, Mr James Baker, and the Soviet Foreign Minister, Mr Eduard Shevardnadze, confirmed what many had anticipated—namely, that the serious and complex but sincere and purposeful backstage negotiations the two sides had been engaged in for many months would result in a breakthrough towards the conclusion of a treaty covering long range nuclear weapons. The decision of the Soviet side to drop the linkage between completing an agreement in START (the Strategic Arms Reduction Talks) and achieving a defence-space accord was perhaps the one most significant contributing factor to this welcome development. Also, the agreement apparently reached on the very sensitive and thorny issue of on-site inspection would, it appears, not only make it possible for the U. S. Senate to ratify, without further delay, the 1974 U. S.-Soviet Treaty on the limitation of underground nuclear weapons (the Threshold Test Ban Treaty or the TTBT) and the 1976 U. S.-Soviet Treaty on Underground

Nuclear Explosions for Peaceful Purposes (Peaceful Nuclear Explosion Treaty or the PNET), but perhaps even help to lower the test ceiling from the 150 kilotons stipulated in these treaties to as low as 50 kilotons.

#### Positive Approach

In the view of some analysts, including myself, the conclusion of the INF agreement, seen together with the latest news from Jackson Lake, does to some extent, meet India's primary and well-founded objection to the Non-Proliferation Treaty, namely, that it dealt solely with horizontal non-proliferation ignoring the equally serious, if not more serious, problem of vertical proliferation. It is our view that we should cease being totally negative on the issue of non-proliferation and, instead, adopt a positive approach to the problem in the interest of speeding our way to the time when, as the Delhi Declaration puts it, "the balance of terror gives way to comprehensive international security."

If this approach is found acceptable, the first step would be to indicate that India would be prepared to participate in negotiating a revised text of the NPT which India and other likeminded countries might be in a position to subscribe to. A revision of the NPT would appear to be fully justified and even necessary in the light of the positive and forward movement in the area of genuine non-proliferation. India should avoid giving the impression that it wishes to see the present treaty scrapped and replaced by an entirely new one. The present treaty has many positive elements in it relating to horizontal non-proliferation. These should be retained. However, the present treaty will require substantive modifications.

#### Acceptable Balance

While it is premature to try and spell out the specific changes that India should try to obtain in the text of the treaty, certain general indications would not be out of place even at this stage.

The preamble to the treaty should be changed, first to reflect more accurately the mandate given by the U. N. General Assembly in Resolution 2028 (XX) especially on the question of "an acceptable balance of mutual responsibilities and obligations of the nuclear and non-nuclear powers." There should also be in the preamble a clearer and more specific indication of the need for a time-bound programme of nuclear disarmament.

I have made a reference earlier to the provision in the present treaty, in Article III, for safeguards agreements which the non-nuclear powers are required to negotiate with the International Atomic Energy Agency. One cannot object to this because under its statute the Agency has a regulatory role besides the promotional one. What should be explored is the desirability and possibility of involving the agency in agreements in the field of nuclear disarmament. At the third special session of the U. N. General Assembly devoted to disarmament, held last year, India had submitted a working paper entitled, "Disposal of the Warheads on the Nuclear Missiles

covered by the Treaty between the United States of America and the Union of Soviet Socialist Republics on the Elimination of their Intermediate-Range and Shorter-Range Missiles (INF Treaty)." In this it was proposed "that the U. S. and the Soviet Union be urged not to recycle their fissile material into other nuclear weapons and to place it under the supervision of the IAEA while keeping it in their custody." The working paper specifically stated: "The involvement of the IAEA in this question could be regarded as a part of the verification system of the INF treaty." Such involvement of the IAEA in the verification system of nuclear disarmament agreements would remove the discriminatory nature of the present NPT. I have no doubt that the IAEA and its very able and forward-looking Director General, Dr Hans Blix, would not consider such involvement as being outside the scope of the agency under its statute, as some have tended to imply in the past.

### Place For India

It has already been mentioned that the penultimate review conference of the present NPT is due next year. I feel that serious consideration should be given to India's participation in the next conference as an observer which is permissible under the rules. It is true that India has not participated in the earlier conferences. The decision not to participate in the first review conference in 1975 was, in my view, correct because India felt it had nothing to contribute and it was uncertain about the proceedings and the result of the conference.

However, after what happened at the first review conference, it would appear in hindsight that perhaps India erred in not attending the subsequent conferences. It is true that the observer status does impose certain restrictions in the sense a country participating as such cannot table proposals or participate in decision-making. But presence at the conference, even as an observer, would give India the opportunity to exchange views with others and even express its views through one or, sometimes, more statements. The 1990 review conference will be a very important one where, in a sense, the future of the NPT will be decided. India should go there not to wreck the conference but in a sincere effort to see reason and common sense prevail and to make its positive contribution to the furthering of the favorable trend which, it would appear, is visible on the horizon.

### Talks in Washington

58500017 Madras *THE HINDU* in English  
23 Sep 89 p 8

[Text] Defence experts of India and the United States, in their first major exchange of views here, have differed sharply on the issue of missiles and nuclear weapons and their proliferation.

At the end of their three-day discussions last night, Dr K. Subrahmanyam, former Director of the Institute for

Defence Studies and Analysis (IDSA), said there was a wide divergence between the Indian and U. S. perceptions.

"I don't think we reached an agreement," he said, adding: "We have agreed to differ."

If India test fired a missile, it would invite a lot of flak from the U. S. as had happened at the time of the Agni launch.

India has always been focussing on elimination of deadly weapon systems, while the U. S. which has built up a huge arsenal, insists on prevention of their proliferation.

Dr Subrahmanyam said proliferation was irresistible as long as the weapons existed. The process of disarmament should therefore begin with those who had first manufactured these weapons.

Both he and the current director of the IDSA, Mr Jasjit Singh, had pointed out to the Americans that India had peace, which was necessary for development, only after it started building up its defence forces.

On American questions about India's "blue-water navy," Vice Admiral (retired) K. K. Nayar, said he had pointed out that the Indian Navy today was too small to be able to cope with its responsibilities. Its budget was \$1.2 billions compared to the Japanese navy's budget of \$10 billions. Even at that level, the Japanese said they still could not claim that they could face threats up to a thousand km from their shore. So there was still a substantial amount of growth required for the Indian Navy before it could say it was adequately covering India's interests.

After three days of conferences, meetings and seminars in Washington arranged by the U. S. National War College and talks with State Department and Pentagon officials, there was, however, a greater understanding of India's policy in Sri Lanka, Siachen and other vital areas, Dr Subrahmanyam said.

The former Indian Ambassador to the U. S., Mr K. S. Bajpai, who led the Indian delegation, said the central idea behind the whole exercise was to promote a general understanding between the policy-makers in the two countries.

The delegates included Mr N. N. Vohra, Secretary, Defence Production; Mr Prakash Shah, Additional Secretary, Ministry of External Affairs, Dr Raja Mohan of the IDSA, Mr N. S. Sisodia, Joint Secretary, Planning and Coordination, Ministry of Defence, Dr K. Santhanam, Adviser to the Defence Research and Development Organization, Air Marshal (retired) Veer Narain, Lt Gen M. M. L. Chibber (retired) and Prof M. S. Venkataramani of the Jawaharlal Nehru University (American studies).

## AEC Chairman Speaks at International Meetings

### Addresses World Energy Conference

51500018 Madras *THE HINDU* in English  
23 Sep 89 p 10

[Text] Bombay, Sept 22. Addressing the 14th Congress of the world energy conference in Montreal, Dr M.R. Srinivasan, chairman, Atomic Energy Commission, said that nuclear power had to be viewed as a part of the mosaic of solutions to the energy problem. "India intends to put to work her endowments of skilled manpower, industrial infrastructure and capability nurtured over three decades in harnessing this source of energy for economic development."

"As a developing country with a large population, the natural aspiration for improved living standards will necessarily result in the energy demand rising steeply during the years to come. It is, therefore, important to develop all forms of energy, including nuclear energy. Unfortunately, public perceptions about energy-related issues are clouded with misconceptions regarding risks versus benefits of energy sources. Decisions on exercising options to tap these sources should be on the basis of a rational analysis and not fear and ignorance," he said.

"As noticed in other parts of the world, there has been a growing public concern in India as well regarding the safety of nuclear energy. This is an area where there has to be a global effort at allaying fears and bringing home the benefits of nuclear energy especially when viewed in the context of dangers posed to the environment by acid rain and greenhouse effects. In the final analysis, it has to be recognized that demonstrating the safe operation of nuclear power reactors is the key to winning the confidence of the public all over the world. International exchange of operational experience is an important element in this regard."

Priority to safety: He said "benefits accruing from any technology always carry some element of risk. As regards nuclear energy, the risk is one of exposure to radiation, and nuclear technologists have always been aware of this aspect. Elaborate steps have been taken and will continue to be taken to ensure a very high degree of safety. The safety procedures are under constant review to ensure that at all times radiation exposure is well within limits not only to the plant personnel but also to the public at large. In India, an independent body, the Atomic Energy Regulatory Board (AERB) is responsible for carrying out regulatory and radiation safety functions in all installations of the Department of Atomic Energy and in radiation installations operated by medical, industrial and research users in the country. Towards this end, it has developed safety codes, guides, and standards. Apart from continuously reviewing all operational aspects of radiation installations including emergency preparedness plans, it also keeps the public informed on major issues of radiological safety."

Regarding reprocessing and waste management, he said "with total protection of the environment an overriding consideration, treatment of radioactive wastes generated during reprocessing has received considerable attention, because they contain nearly 99 per cent of the activity generated in the entire nuclear fuel cycle."

"Details of bituminization and vitrification process have been standardized and a pilot waste immobilization plant (WIP) has been set up incorporating advanced features like complete remote operation and maintenance. A facility for interim storage of the vitrified waste from this plant has also been built."

Dr Srinivasan said "The sites for the ultimate disposal of vitrified waste are the igneous rock formations and some selected sedimentary deposits. A programme to investigate potential sites for repositories in homogenous and massive peninsular gneisses and granite formations has been drawn up. Studies are under way to assess the suitability of this type of formations for a repository. A long-term action plan has also been formulated for the management of these wastes."

### Study on Use of Thorium

Studies are said to be under way to generate technical data information on the use of thorium. The AEC is considering commissioning of small reactor.

Technological developments to utilize thorium as a blanket material and uranium 233 as fuel in the reactor will have to be taken up in the Nineties so that this option is available early next century.

The country has large deposits of thorium, in the long term, suitable thorium based reactors will have to be developed to supplement the conventional sources for power generation. With this objective, initially thermal reactors utilizing natural uranium as fuel and heavy water as moderator have been chosen. These would provide the plutonium inventory to fuel fast breeder reactors, which could convert thorium in the blanket to uranium 233, and this in turn could be used along with thorium in thermal or fast breeder reactors.

### IAEA Vienna Meeting

51500018 Madras *THE HINDU* in English  
28 Sep 89 p 6

[Text] New Delhi, Sept 27. "Nuclear technology is highly demanding, but we are convinced that its rewards are high if we face up to the challenges," Dr M.R. Srinivasan, Chairman, Atomic Energy Commission, said in his address today at the 33rd regular conference of the International Atomic Energy Agency (IAEA) in Vienna. A summary of the address was made available to the press by the Department of Atomic Energy (DAE) here.

Highlighting the various milestones in the Indian nuclear power programme, Dr Srinivasan said India's commitment to harness nuclear energy for economic development is deep-rooted. He made particular reference to the

attainment of criticality of the first unit of the Narora Atomic Power Station (NAPS) in March 1989 and its synchronization to the grid in July 1989. He added that innovative designs were made in the 235 MWe pressurized heavy water reactors (PHWRs) at Narora to suit the moderately seismic conditions and other characteristics of the site.

He also referred to the complex engineering solutions that were evolved to get over the problems inside the calandria of the two indigenously designed units of the Madras Atomic Power Station (MAPS). "Despite the complexity of the problem and the difficult location of the damage in a very high radiation zone we were able to bring the two reactors back into operation reasonably quickly even though at reduced power levels," Dr Srinivasan said. Other modifications, he said, are now being made to operate them at full power level.

"After the Chernobyl accident, public confidence in nuclear power has never been the same," he remarked. He drew attention to the 1988 UNSCEAR report which stated that the contribution of nuclear power production to the annual dose of radiation received by an individual was only 0.0002

of radiation from natural sources and the finding that the radiation dose from the Chernobyl accident to the public was less than a year's dose from natural sources. These findings, however, do not seem to have the desired impact on the public, he said and stressed the need for a strong public information effort.

Dr Srinivasan also underlined the need for international cooperation to implement and finance feasibility studies for small and medium power reactors. In this context he referred to the recommendations of the IAEA Senior Expert Group on Mechanisms to Assist the Developing Countries in the Promotion and Financing of Nuclear Power Programme which had called for closer cooperation with the World Bank in energy and power sector planning. He also urged the member states of the OECD to review the OECD consensus on financing conditions.

Hans Blix reappointed: The IAEA general conference today approved by acclamation the nomination of Mr Hans Blix of Sweden for a third four-year term of office as Director-General of the Agency, effective December 1, 1989.

### **Commentary on Satellite Launch Vehicle Booster**

*BK2510144989 Delhi General Overseas Service in English 1010 GMT 25 Oct 89*

[Narendra Gupta commentary: "Successful Firing of India's Polar Satellite Launch Vehicle Booster"]

[Text] The successful test last week of the first stage rocket booster for India's own Polar Satellite Launch Vehicle, PSLV, marked another major milestone along the country's policy of developing indigenous capability in high technology areas. The rocket motor was 20

meters long, 2.8 meters in diameter, and contained a 128 tons of solid fuel as propellant. It has been announced that in the test conducted at Sriharikota in Andhra Pradesh, the booster's performance met all design parameters and produced peak thrust of 450 tons. This rocket engine, the largest built in the country so far, is designated to be the first stage propulsion unit of a 4-stage launch system that will be (?married) to the satellite and be used to launch the 44-meter-long PSLV in late 1990 or in early 1991.

The success of Indian engineers in building solid fuel rockets is all the more creditable because most countries designed liquid propellant motors first. This becomes significant when considered with the fact that the development of rocket motor is based on a number of totally indigenous technologies pioneered in the Vikram Sarabhai Space Center and at the Shar center of ISRO [Indian Space Research Organization] at Sriharikota involving important developments in the disciplines of solid propellant rocket technology.

The propellant has also been indigenously produced by Indian industry based on the ISRO know-how and technology transfer. The powerful first stage and three other stage motors are needed to provide the thrust in order to lift the satellite to a height of 700 to 1,000 km which is the altitude needed to inject the satellite into polar orbit. As can be visualized in a polar orbit, a satellite travels along the longitude over the earth in an elliptical orbit. A polar orbit satellite is essentially a remote sensing satellite, which, with the help of electronic and optical sensors, carries out various earth observations which are so essential for economic development. These include observations of water distribution, cropping pattern, including discoveries of any area being affected by pestilence, forest cover, geological and coastal surveys and mapping. It can be appreciated that such information can be most useful for long-term use as well as for early corrective action for agriculture, ecology, mining, and urban and rural planning.

The digital data transmitted by such earth resource satellite is received by various earth stations. In India, we have two such facilities: One is the National Remote Sensing Agency, NRSA, in Hyderabad, and the other is the Space Applications Center or SAC at Ahmadabad. The digital data received at these stations is processed by computers and these computers provide pictorially the information required of the geographical region on the earth's surface, which is desired to be surveyed. At present two stations, the NRSA and SAC, receive in India process [as heard] and provide the earth resource information to the central and state governments and to any other organization that may want it on a commercial basis.

India also receives data from the Indian Remote Sensing Satellite, IRS 1-A, which was launched for India on a Soviet rocket booster. India has the earth receiving station, the ability to build earth resource satellites, but

not yet the ability to launch such payloads to the altitudes desired. At this stage, therefore, the success of the test of the first stage booster of the PSLV culminating in the satisfactory testing of all the propulsion modules of the PSLV becomes meaningful. Once the launch vehicle is test-launched successfully and productionized [as heard], India would have the capability of launching and using remote sensing satellites independently. After attaining the capability for launching polar orbit vehicle, the next logical step would be to endeavor to build our ability to launch geo-synchronous satellite to a height of 36,000 km in order to emplace it in its desired slot.

Remote sensing capability also can contribute considerably to maintaining peace in the region. Satellite surveillance capability will ensure that no adversary can take the country by surprise militarily as any large-scale movement would provide advance warning to the country. Also satellite capability confers a very dependable ability for verification in regard to deployment in terms of arms control agreements. With such availability of transparency of an adversary's action war becomes less likely.

All said and done, the success of the PSLV's first state booster is a step in the right direction. It brings us closer to our goals of developing high technology indigenously, reduces dependence on others in nationally vital fields and will ultimately lead to enhance economic development, increase regional cooperation, easing of security tension, and better prospects of ecological protection. This will give India an increased sense of national pride and achievement.

#### **Kalpakkam Nuclear Power Plant Set for Production**

51500027 Bombay *THE TIMES OF INDIA* in English  
12 Oct 89 p 7

[Text] Kalpakkam (Tamil Nadu), Oct 11 (UNI). The fast breeder test reactor, (FBTR), widely held to be the base for the next generation of nuclear reactors of the country, will start producing power from March next year.

The FBTR, located at the Indira Gandhi Center for Atomic research (IGCAR) here went critical for the second time in May this year after a two-year shut down following major damages to certain in-vessel components due to a fuel handling error. Its operation would be raised to one MW (thermal) from next month from the present level of 500 KW.

The IGCAR director, Mr C. V. Sundaram, said the reactor would be taken to ten MW (thermal) level by March next year when the turbogenerator would be switched on to generate three MW of power.

The reactor with a 40 MW (thermal) (13 MWT) capacity which attained first criticality in October, 1985, is the only one among 12 liquid metal fast breeder reactors (LMFBR) in the world to use carbide fuel.

The reactor is fed with the plutonium carbide fuel recovered from the Madras atomic power station here and uranium (U-233) carbide.

Mr Sundaram said after switching over to power generation, the small core of the reactor would be replaced with the full core to enable the reactor attain its full capacity by 1992.

He said this month the scientists would charge the steam generator with liquid sodium to enhance the operation to one MW.

However, Mr Sundaram said, the sodium systems using liquid sodium as coolant have been functioning without any problem. Despite the reactor problems the sodium systems, including pumps and intermediate heat exchanges, have been functioning well throughout.

Another reactor ready for operation at the IGCAR is the "Kamini", a neutron source reactor fuelled by uranium (U-233). Mr Sundaram said the fuel, an alloy of aluminum and U-233, has already been developed by the Bhabha Atomic Research Center (BARC) and was undergoing final tests. After clearance of the fuel and the reactor by the atomic energy regulation board, "Kamini" was expected to go critical by the end of this year.

This 30 KW reactor operating at low temperatures would provide independent neutron beams for radiography of irradiated and unirradiated objects and a beam of neutrons to conduct experiments in radiation physics. It could also enable the study of short-lived isotopes and neutron activation analysis.

Mr Sundaram said the facility could also provide assistance to forensic science.

Meanwhile, Dr R. Schelenz of the International Atomic Energy Agency (IAEA), said today India ranks among the developed countries in nuclear power technology advancement.

Talking to journalists at the IGCAR here, Dr Schelenz, who heads the chemistry division of the IAEA said India played a vital role in assisting the IAEA in transferring technology to other countries.

Dr Schelenz was hesitant to comment on nuclear power development in India saying it would not be proper to assess a member country.

He said after the Chernobyl nuclear plant accident there was an increasing awareness among the people in safety aspects and the IAEA was assisting the member countries in setting up national monitoring centers. More than 40 countries especially in West Africa and Africa have benefited so far. These countries depend heavily on food imports from Europe.

**Features of Narora Atomic Power Plant Detailed***BK2210123089 Delhi General Overseas Service  
in English 1010 GMT 22 Oct 89*

[Talk by M.K. Shukla of THE HINDUSTAN TIMES]

[Text] The first 235-megawatt electrical unit of the Narora Atomic Power Station in the north Indian state of Uttar Pradesh has been dedicated to the nation. The second 235-megawatt unit of the power station is likely to be commissioned by March 1990. The Narora plant is an important milestone in the country's nuclear program. It is the forerunner of a whole new generation of nuclear power plants that will come into operation in the next decade. The reactor of the plant and its other crucial equipment like steam generator have been designed and built indigenously.

The Narora Atomic Power Station is situated on the banks of the Ganges in the Bulandshahr District of Uttar Pradesh. It is the fourth atomic power project to be commissioned in the country and second to be designed and built indigenously. The other three in commercial operation are two 160-megawatt units at Tarapur in Maharashtra, two 220-megawatt units at Kota in Rajasthan, and two 235-megawatt units at Kalpakkam in Madras. The Narora Atomic Power Station's first unit is the seventh atomic power unit of the country and possibly 430th of the world. When the second 235-megawatt unit of the plant is commissioned next year, the two units of the Narora Atomic Power Plant are expected to produce 435 megawatt units. The plant uses natural uranium as fuel and heavy water as moderator and coolant. It is the first pressurized heavy water heavy water reactor in the world that has been provided with double containment capable of withstanding full pressure likely to be experienced in the event of an accident.

The seismic design concept for Narora station takes into account two levels of earthquake. One is known as the operation basis, which is expected to occur during the life of the plant and that time the reactor is expected to remain operational. The second level gives a ground motion which is considered maximum at which all the safety systems are expected to be fully functional and the reactor shut down safely. All the equipment and systems, which are required to be operational under these two events, have been designed to ensure that the Narora station will be fully safe for the kind of earthquake that is likely to occur during the life of the plant.

There are a number of barriers in the Narora plant design besides the double containment to prevent radioactivity from reaching the environment. All the systems have been designed to give reliable performance and are tested regularly for their performance. Further, the liquid waste management system at the Narora plant has been designed in such a way that no radioactive effluence, treated or otherwise, will be discharged into the Ganges. The effluence discharged from the power station premises are also monitored to ensure that they comply with national and international standards. In addition,

environmental surveillance programs are also operated, extending up to 30 km from the location of the power plant. Similar measures will be in operation in the Narora Atomic Plant.

The Narora Atomic Power Station, whose first unit gained criticality in March 1989, has become operational in 13 years and at an estimated cost of 532 crore rupees. The country is likely to establish about 10,000 megawatts of nuclear power capacity by the turn of the century. Several steps are being taken in this direction.

**Completion of Soviet-Aided Nuclear Plant Moved Up***BK2310104989 Delhi THE HINDUSTAN TIMES  
in English 14 Oct 89 p 1*

[Text] New Delhi, Oct. 13—India and the Soviet Union today agreed on advancing the completion of the Soviet-aided nuclear power station at Koodamkulam in Tamil Nadu by a year.

At the first meeting of the working group set up to implement the agreement between the two countries in November last year for the construction of two nuclear power reactors of 1000 MW [megawatts] each, it was decided that to complete the work before the scheduled date the Soviet Union would provide all the components for the nuclear power stations. The scheduled date of completion is 1998 for the first station and 1999 for the second. Koodamkulam is 25 km north-west of Kanyakumari on the east coast.

Atomic Energy Commission Chairman M. R. Srinivasan told the Press at the end of the meeting that the Indian side was satisfied with the safety features of the Soviet design. Soviet delegation leader V.V. Maryin added that the Soviet reactors were "reliable and safe and meet the safety requirements set by the International Atomic Energy Agency".

Mr Maryin is the first deputy chairman of the bureau of the USSR Council of Ministers for fuel and energy complexes. He led a delegation of 11 Soviet officials to the meeting while the Indian delegation was led by Dr Srinivasan.

The Soviet delegation chief denied that the safety system would be built by the French or the reactor would have major components designed by the German company Seimen. However, he said they would consider any component available anywhere with superior technological features.

The Soviet reactor will be pressurised light water reactor of the VVER [expansion unknown] type different from the Chernobyl one, which was RMBP [expansion unknown] type. (The Chernobyl reactor used graphite as moderator and light water as the coolant while the type that will be set up in Tamil Nadu will have light water as the moderator and coolant. There is thus no comparison between the two).

Dr Srinivasan said the cost of the project would be worked out by a specialist group. He reiterated the provision in the Indo-Soviet agreement on the project that the spent fuel rods would be returned to the Soviet Union and that that country had agreed to supply the fuel for the reactor.

However, Dr Srinivasan told a questioner that there was nothing in the agreement precluding India from buying fuel (enriched uranium) from elsewhere for the Soviet reactors. The fact was that even several Western countries were buying the fuel for their own reactors from the Soviet Union.

Asked about the Indian thinking on having its own light water reactors using enriched uranium, Dr Srinivasan said it would depend upon the cost comparison and the experience the Indian side would gain from the working of such reactors here. At present the two Tarapur reactors set up by the USA are the only power generating units using this technology; all the other Indian reactors are based on natural uranium as fuel.

#### **France Offers Engine for Satellite Launch Vehicle**

*BK0911163889 Hong Kong AFP in English  
1615 GMT 9 Nov 89*

[Text] New Delhi, Nov 9 (AFP)—India is trying to convince France to lower the price on an advanced rocket engine that Paris has offered to sell for use in a satellite launch vehicle, India's top space scientist said Thursday [9 November]. The Indian Government believes the price quoted by France is too high and is trying to bring it down, Space Commission Chairman U.R. Rao told the PRESS TRUST OF INDIA (PTI) in southern Bangalore city.

It was the first confirmation by an Indian official that France had offered to sell the engine and that negotiations were on with the rocket development agency Arianespace.

The United States has reportedly been trying to pressure France not to allow the sale, saying it could give India the capability to develop advanced long-range ballistic missiles. Washington's stand was disclosed in official testimony on October 30 before a joint meeting of the House Foreign Affairs Subcommittees on Arms Control and U.S. Trade Policy.

Mr. Rao said the money demanded was about five times the amount India has allocated for local development of the cryogenic engine to be used in the launch vehicle, which would put satellites in a geosynchronous orbit.

The Indian Space Research Organisation (ISRO), which is involved in the negotiations with Arianespace, has a 3.5 billion rupee (212 million dollar) budget for the engine's development, PTI said. India has the capacity to build all stages of the rocket except the cryogenic last phase to be fuelled by liquid hydrogen and oxygen.

Mr. Rao hoped that the deal with France would be struck by the year-end if the price was lowered, terming the present price tag unacceptable. If the negotiations fail, ISRO would try and develop the engine on its own, he said.

India has been given the option of buying the engine outright or in a package involving technology transfer, Mr. Rao said. "We have not made a decision and everything depends on the cost," he was quoted as saying.

Mr. Rao said India's Insat-1D satellite, which was damaged in a June accident at a U.S. launch pad, would be launched by May next year. A new antenna for the satellite is being built in Italy, he said.

India's ambitious space programme, launched in 1962, is geared towards mass communication and education through satellites, and surveying and managing natural resources through remote-sensing technology.

#### **Commentary Views Production of Radio Isotopes**

*BK3110125889 Delhi General Overseas Service  
in English 1010 GMT 31 Oct 89*

[Biman Basu commentary: "Peaceful Uses of Atomic Energy"]

[Excerpts] The recent report of a new method of growing oil palm plants in the lab developed by the Bhabha Atomic Research Center [BARC] has raised hopes of increasing the production of a valuable edible oil. [passage omitted]

Development of a tissue culture technique on growing oil palm is just one small activity of the BARC. The main function of the center is in the field of developing radio isotopes and other techniques of peaceful application of nuclear energy. [passage omitted]

Radio isotopes are produced in all nuclear reactors, including those used for power generation, but for producing specific radio isotopes for different applications, research reactors are used. In India, there are six research reactors, including the Dhruva [reactor at Kalpakkam in Madras], which are used to produce these isotopes. The BARC has facilities for not only producing these isotopes, but also for separating and packaging them for users.

For the production of a new type of product called Phosphorus-32 Biomolecules, which finds use in genetic engineering and biotechnology programs of the country, a new laboratory named (Jonaki) was commissioned in November 1987. It will meet the total requirements of the product in future. [passage omitted]

India is the only developing country to have mastered the entire technology of nuclear cycle, from mining of uranium and fabrication of the fuel to designing and construction of nuclear plants and running them, and

this country has proved beyond doubt that the atom is not an enemy of man but a helpful friend.

### Uranium Corporation Plans To Expand Production

51500016 Madras *THE HINDU* in English  
2 Oct 89 p 4

[Text] The Nuclear Fuel Complex Board has decided to locate its new plant at Turamdih, adjacent to the proposed processing mill, Mr M. K. Batra, Chairman and Managing Director, Uranium Corporation of India, has said.

Expansion work is under way at the uranium recovery plant in Mosaboni. The existing effluent systems at Jaduguda is being upgraded, he told the annual general meeting of the company.

The company has also introduced back-filling system in the Bhatin mines, which would help increase ore production. To meet the increasing demand for uranium for the nuclear power plants, UCIL is also considering the opening up of more uranium deposits.

## ISRAEL

### Request for Canadian Nuclear Reactor Confirmed

TA3110095689 Jerusalem *THE JERUSALEM POST*  
in English 31 Oct 89 p 1

[Report by Nomi Morris and Larry Derfner]

[Text] Toronto—Energy Minister Moshe Shahal has asked Canada to sell Israel a \$1.1 billion nuclear reactor, according to news reports here which prompted concern from local officials.

The reports were confirmed yesterday by the Energy Ministry in Israel.

Shahal made the request for the CANDU heavy-water reactor at an international conference in Montreal last month. Canada's Energy Minister Jake Epp wrote to Shahal telling him he would have to contact the Department of External Affairs before talks on the matter could proceed.

Federal officials have already expressed concern about how Israel might use the reactor, which is intended for electrical generating projects. They predicted the sale would provoke anger in Arab countries.

Before Canada would hand over the reactor, the Department of External Affairs and the Atomic Energy Control Board would demand that Israel sign the Nuclear Non-Proliferation Treaty, or at least a bilateral agreement with Canada on the use of nuclear technology.

Even after the sale, Israel would be required to submit to regular follow-up checks by Canada to ensure the reactor was not used for military purposes.

Larry Derfner adds:

The Canadian nuclear facility would be used solely for producing electricity, Energy Ministry spokesman Elihu Ben-On said last night, noting that a number of countries use nuclear power for energy but do not make nuclear weapons.

During his meeting with Epp at the World Energy Conference in Montreal in the middle of last month, Shahal agreed to allow Canadian experts to inspect the construction of the facility in Israel.

### IBM Computer Said To Aid H-Bomb Program

PM0211163389 London *AL-SHARQ AL-AWSAT*  
in Arabic 31 Oct 89 pp 1-2

[Husni Khashabah and Muhammad Khalid report: "American Company Contributes to Israeli Nuclear Armament Program"]

[Excerpts] London, Washington— *AL-SHARQ AL-AWSAT* has learned that IBM, one of the major U.S. computer companies with vast interests in the Arab world, is participating in the production of an advanced computer for Israel under the Israeli program for the manufacture of hydrogen bombs.

Reports received by *AL-SHARQ AL-AWSAT* indicate that the IBM contribution to the U.S. [as published] nuclear armament program will threaten the company's interests in the Arab world. [passage omitted]

In a telephone contact with *AL-SHARQ AL-AWSAT* from the company's European headquarters, a spokesman for IBM said that the company's board had applied to the U.S. Government for permission to sell an advanced computer system to Israel.

In reply to an *AL-SHARQ AL-AWSAT* question from London, the spokesman, Alan Gillings [name as transliterated], confirmed the truth of the *AL-SHARQ AL-AWSAT* Washington office story.

Asked to comment on reports that Israel will use the system for military purposes, and particularly in the manufacture of a hydrogen bomb, the spokesman said that it was his company's policy not to discuss details of the final uses of its products. [passage omitted]

### NATO Report on Satellite's Failure Denied

TA1510115289 Tel Aviv *HA'ARETZ* in Hebrew  
15 Oct 89 p 5

[Report by military correspondent Dan Sagir]

[Excerpts] Israel Aircraft Industries [IAI] has denied an internal NATO intelligence report, published last week in Europe, alleging that Israel has already launched its second satellite, Ofeq-2, into space. The report notes that the launch failed and that the Israeli satellite burned and fell back to earth. Doron Suslik, head of IAI's media directorate, says that Ofeq-2 has not yet been launched



and, consequently, has not yet burned out. According to Suslik, the numerous recent reports about the imminent launch of a second Israeli satellite notwithstanding, a final date has not yet been set for the launch of Ofeq-2. [passage omitted]

The HA'ARETZ correspondent points out that the report coming from Europe about the abortive launch of Ofeq-2 coincides with the Soviet report that Israel fired a missile to a distance of 1,300 km less than a month ago. [passage omitted]

### Long-Range Missile Deployment Alleged

NC1610103689 Beirut AL-NAHAR in Arabic  
10 Oct 89 p 4

[Excerpt] Hasbayyah, AL-NAHAR—According to military sources in the border zone in the south, the Israeli forces recently established long-range surface-to-surface missile bases 15 km from the Lebanese-Israeli border, south of the Menora settlement, and 20 km east of the Mediterranean coast.

The missiles have a range of over 1,000 km and can reach as far as Jordan, Syria, Turkey, and Cyprus. Israeli authorities have banned civilians and military personnel from entering the hill area, restricting entry to officers working at the base.

According to the same sources, these bases are the closest ever to the Lebanese border. No artillery shell, no matter what caliber, can penetrate the defenses erected around these missiles. [passage omitted]

## JORDAN

### Paper on Israel's Nuclear Power, U.S. Backing

JN3110121289 Amman SAWT AL-SHA'B in Arabic  
31 Oct 89 pp 1, 14

[Editorial: "Why a Nuclear Power in the Middle East?"]

[Text] Reports about nuclear cooperation between Israel and the racist regime in Pretoria, the transfer of U.S. technology from Israel to Pretoria, and the two countries' undertaking of a successful long-range nuclear missile launching are clear evidence that Israel is not stopping at the limits of its current aggression against the Arab world. Instead, Israel plans for further expansion at the expense of the Arab world with the help of the nuclear threat it holds over the region.

U.S. press sources have affirmed that Israel is capable of producing the hydrogen bomb. This report alone is enough to ascertain what designs of aggression and expansion Israel harbors against the Arab homeland. Israel's designs are far from the current masquerade of searching for a peace in the region, which can never be established between a state that possesses nuclear capabilities and parties that cannot compete with the nuclear option.

In response to the serious reports that are leaked from Washington on Israel's nuclear capabilities, the Arab world can do nothing more than complain and mobilize international public opinion against such a state, which drools after the sources of this power while the two superpowers are doing their best to eliminate these kinds of weapons. However, the truth remains that the United States, the strategic ally of Israel, has turned a blind eye to Israel's nuclear capabilities, and that Israel would not have dared to carry out such a nuclear experiment had it not been for U.S. technology.

## PAKISTAN

### Editorial Discusses Pakistan's Nuclear Claims

BK0311102789 Delhi PATRIOT in English  
27 Oct 89 p 4

[Editorial: "Pakistan's Nuclear Claim"]

[Text] Dr Abdus Qadeer Khan, the nuclear research boss of Pakistan, has claimed that Pakistan had "full capability for enriching uranium and that the coming years will see great success in this field by Pakistani engineers". It may be recalled that a few months ago, Dr Khan had claimed to have developed a completely new technique to enrich uranium at lower temperature, using much less energy. The scientific community anywhere in the world has not been able to corroborate this breakthrough. His reported statement promises successes by the engineers in the coming years. The wording of the statement indicates that the success, if any, is perhaps in the laboratories of the scientists and the engineers involved in the pilot plant, and a production plant has yet to step in. We should also be aware of the planned disinformation attempts of Dr Khan regarding his achievements vis-a-vis India in the field of nuclear weaponry. However, independent US sources have been saying for more than a year that Pakistan has been operating its uranium enrichment facility since 1987 and that by now it should have accumulated enough weapon-grade uranium for more than ten thermonuclear bombs. Whether Dr Khan can assemble a bomb which the Pakistan armed forces would accept for field use is another matter. This is in spite of the alleged tests carried out in China or the possible use of computer modelling to eliminate testing. Further, Pakistan is still far from establishing a source of plutonium and later its enrichment for use in fission bombs. We are sure that the Indian Government has this information and perhaps additional intelligence data and it is fully prepared for all eventualities.

## UNITED ARAB EMIRATES

### Bush Comments on Israel-RSA Cooperation Viewed

JN0111130089 Dubayy AL-BAYAN in Arabic  
30 Oct 89 p 1

[Editorial: "The Crux of the Problem"]

[Text] The Arabs need too much patience. In fact, perhaps they need to close their eyes and ears and to stop

thinking in order to find some credibility in U.S. President George Bush's recent statement on nuclear cooperation between Israel and South Africa, in which he said: "If the U.S. television network's report on Israel's illegal transfer of technology to South Africa turns out to be true, then this will not contribute to promoting relations between us, but will complicate matters".

It would not be strange if another statement were made by the U.S. President or his spokesman tomorrow or the day after to the effect that nothing has transpired to confirm his doubts, or that the transfer of technology has actually occurred, but it was legal!

The lack of credibility does not lie in the U.S. President's intentions, but in his deliberate disregard for the crux of the problem, and in the creation of clamor over a minor aspect of this problem. The crux of the problem is that both Israel and South Africa possess nuclear arms. This would have been impossible for this to happen had not there been firm cooperation between the two fascist

regimes that have the blessing and support of the United States. Israel has provided technology, and the fascist government has provided the appropriate place to conduct tests, whether on its desert territory or south of the Indian and Atlantic Oceans. This is an established fact that has been known since 15 years or more, which has been confirmed by several parties to this issue. We do not believe that the U.S. Intelligence Agency, [as published] whose director was Bush before he entered the White House, did not know this. Therefore, saying that it is true, or if it will turn out to be true is meaningless, and it is only an attempt to throw dust in the eyes.

President Bush would have done better had he recognized the fact that he insists on ignoring—namely, that the danger is not posed by the two fascist regimes' exchange of nuclear technology, but basically by their possession of it. This poses a threat to the whole world's security, not only to the Arabs' security.

### **PRAVDA Comments on Israeli Missile**

*PM0611123989 Moscow PRAVDA in Russian  
3 Nov 89 First Edition p 5*

[Own correspondent S. Filatov report under the rubric "International Notes": "Jericho II over the Mediterranean"]

[Text] Algiers—These days the Arab press is frequently returning to an alarming subject—Israel is working to create its own missile. The Beirut newspaper AL-NAHAR writes that new intermediate-range missiles capable of reaching any neighboring state within a radius of up to 1,000 km have been positioned in the north of Israel's territory, close to Beirut.

All this forces one to recall once more events which occurred not so long ago...

Four hundred km is a great distance. All the same it will not seem so if you know that a missile launched from the territory of another state, and an unfriendly one at that, falls precisely 400 km from the place where you live. The thought immediately arises: "The next one may land here." The inhabitants of Benghazi in Libya found themselves in roughly this position on a clear day, 14 September, this year. They have firsthand experience of what such a bombardment means: In April 1986 Benghazi was bombed by deckborne aircraft of the U.S. 6th Fleet. And now an intermediate-range Jericho II missile launched from Israel has fallen into the sea 400 km away, directly off Benghazi.

This missile is a serious, highly destructive, nuclear-capable combat weapon. It was developed not so long ago. The Israeli Army is testing it. Tests were particularly intensive between May 1987 and September 1988.

It should be said that no vigorous protest campaign was mounted against Tel Aviv's missile program. Although it was condemned even from the Arab League platform. But Israel purposefully continued its work on Jericho II. And this is the result—the missile, which traveled almost 1,500 km, proved that it can strike almost any Arab capital.

It is significant that in this instance the Western mass media, which usually give a detailed description even of explosions caused by homemade bombs, all maintained a surprisingly concerted silence, or limited themselves to short reports. Yet the Jericho II fell not so far from Italian and Greek shores.

A wave of protests broke out in Arab circles. In a letter to the UN secretary general, Libya rightly indicated that the launch of the Israeli missile is provoking a "new escalation of tension in the Mediterranean basin." These tests also present a danger to air and sea routes across the sea.

Without U.S. support the Israelis would not be able to get away with their aggressive policy, Chedli Klibi,

secretary general of the Arab League, stated in Tunis. The United States bears the responsibility for this hostile act.

The Jericho II tests, and now also the deployment of the intermediate-range missiles in their combat positions are forcing people to ask this question: Why does Israel need this precisely now that certain hints at the possibility of settling the Near East crisis have emerged? The appearance of a new type of nuclear missile in the Near East, in whoever's hands, is fatal inasmuch as the opposing side sooner or later will answer this challenge by creating its own missiles.

### **Chernobyl Death Toll Passes 250; Complacency Hit**

*PM101112189 Moscow MOSCOW NEWS in Russian  
12 Nov 89 (Signed to Press 6 Nov 89) p 2*

[Andrey Pokrovskiy article: "Forestalling Another Chernobyl"]

[Text] More than 250 of the people who were on duty during the explosion or helped in the elimination of the consequences of the most serious accident of the 20th Century have already died. The diagnoses regarding the deceased vary. However, one thing is clear: Chernobyl is presenting its dreadful reckoning, and hardly anyone can say today with absolute certainty what its full extent will be. Charity and safety—this is the motto of a new movement, the "'Chernobyl' Union."

Anyone who shares this concern can become a member of this social organization. The "liquidators"—the people who took part in the elimination of the consequences of the accident at the nuclear electric power station [AES] were the first to come up against departmental callousness. Today they are a thorn in the flesh of bureaucrats because they are debunking the reassuring statistics with their arguments and details of their life stories. However, the voices of individual people frequently go unheard in high offices. It is more difficult to "turn a deaf ear" to a public movement.

What does the "'Chernobyl' Union" regard as its main task? Placing the nuclear power industry, and that includes design, construction and operation, under public scrutiny. The Union already carries out independent monitoring of the radiation situation at the AES.

However, the new union is not just concerned about the "technical" aspect of the matter.

"Those who used to live or are still living in the contaminated territories and also the 'liquidators' need skilled medical services, material assistance, and legal protection," Robert Tilles, member of the executive committee and candidate of technical sciences, who took part in the construction of the Chernobyl "sarcophagus" said. "The union is setting up a data bank which will comprise information about all the people who were subjected to the effects of ionizing radiation. With the help of this

electronic card-index it will also be possible to uphold the interests of those who have suffered from radiation not connected with the Chernobyl catastrophe: nuclear installation workers, servicemen, inhabitants of areas adjoining nuclear testing grounds. Here is the address of the "Chernobyl' Union": 129010, Moscow, P.O. Box 17.

We are now thinking about ways to organize a "campaign to eliminate radiation illiteracy." Negotiations are already under way with a view to acquiring diagnostic apparatus, medicines, and personal radiation meters abroad. There is also an accord to send the seriously ill for treatment abroad and to organize summer vacations in resorts for children who have suffered.

### **New Body Founded to Track Consequences of Chernobyl**

*PM0911114389 Moscow IZVESTIYA in Russian  
9 Nov 89 Morning Edition p 2*

[Special correspondent V. Zaykin report: "Chernobyl' Union Unites Those Who Are Not Indifferent"]

[Text] Kiev—The All-Union Conference of Participants in Eliminating the Aftermath of the Accident at the Chernobyl Nuclear Electric Power Station [AES] has been held in Kiev. What made people from 30 of the country's cities travel to the Ukrainian capital?

More than 600,000 people have already passed through the crucible of Chernobyl. Many of those who worked for a long time under conditions hazardous to health need help today.

It is no coincidence that under these conditions a movement of participants in eliminating the aftermath of the accident has begun to come spontaneously into being from below. The Chernobyl AES Veterans Council raised the question of setting up under the All-Union Scientific Center of Radiation Medicine an expert council to establish the causal link between illnesses and disability and the effects of ionizing radiation. The Moscow "Chernobyl' Union (IZVESTIYA referred to it in issue No 303) tackles questions of social and legal protection both for participants in eliminating the aftermath of the accident and for persons living in the contaminated territories. It also independently monitors the radiation situation at nuclear installations. The Kharkov association gives material assistance to those who worked in the "zone." The Estonian Council of Ministers has assisted the republic Chernobyl Committee. I could continue with examples.

To establish businesslike contacts, exchange experience, and channel uncoordinated trends in the same direction—these are the aims which the representatives of various organizations brought to the conference. The coordinating council formed at the forum was entrusted with liaising among organizations and, at the same time, preparing for

a congress of participants in eliminating the aftermath of the accident. It will be held at the end of April 1990—the 4th anniversary of the Chernobyl disaster.

"We have seen that our movement is on a large scale and is capable of giving real assistance to those who need it," S. Voloshchuk, vice president of the Moscow "Chernobyl' Union, said. "Talks have already been held with public organizations in the FRG, Italy, Spain, the United States, and Finland on cooperation in questions of diagnosing, treating, and preventing illnesses connected with the effects of radiation."

### **International Meeting Examines Nuclear Accidents**

*LD3010214589 Moscow TASS in English 2112 GMT  
30 Oct 89*

[Report by TASS special correspondent Veronika Romanenkova]

[Text] Sochi October 30 TASS—Analysis of all the aspects of the 1986 Chernobyl disaster and its implications is the task of the first working group on large accidents and their consequences. The group has begun its sessions here on Monday. Organised by the nuclear societies of the USSR and the USA, this international meeting is attended by around a hundred prominent foreign scientists.

For some years now the problems of nuclear power have been in the centre of world public attention. Until quite recently the advantages of nuclear power plants [NPP] (now they number 307 in the world), the efficiency and the practically inexhaustible fuel resources have been taken for granted. Construction of NPP's instead of hydro and thermal power stations has saved millions of hectares of arable land and reduced atmospheric pollution.

However, the three-mile island accident in the USA in 1979 and especially the Chernobyl tragedy in the USSR have sharply changed the public attitude to the NPP's. And specialists have been forced to revise some of the positions of principle which had until recently seemed unshakable.

"In the five days of work the international group intends to discuss NPP safety, the transfer of products of fission in environment, dosimetry, and effects on human health," Dr. Sc. (physics and mathematics) Leonid Bolshov from the nuclear society of the USSR said opening the conference.

"The venue for the meeting has not been selected accidentally", chairman of executive committee of the Sochi city council Sergey Derendayev said. "It is for this reason that our city which is actively working for disarmament and nuclear security that the United Nations has given the status of a city—messenger of peace. The present meeting of scientists will not only be largely helpful in solving the safety problems of nuclear power but will also contribute to the cause of peace".

## AUSTRIA

### Mock, Johanes Sign Nuclear Safety Accord

AU2510123289 Vienna Domestic Service in German  
1100 GMT 25 Oct 89

[Text] CSSR Premier Ladislav Adamec ends his 2-day visit to Vienna today. In view of the relations between Austria and the CSSR that have not always been free from problems, a positive new chapter of contacts should be initiated, the Austrian and CSSR side stressed. The foreign ministers from both countries, Mock and Johanes, signed a new agreement on nuclear safety and radiation protection this morning. Mock briefed Johanes on the concerns of the Austrian population in connection with the construction of new nuclear power plants in the CSSR, above all the planned power plant in Temelin which is situated about 60 km north of the Austrian border. Johanes stated that the CSSR needs nuclear energy primarily for reasons of environmental protection.

## CANADA

### AECB Cites Safety Concern in Darlington Startup Delay

51200001 Toronto THE SATURDAY STAR in English  
16 Sep 89 p A3

[Article by William Walker: "Delay Start-Up at Darlington, Hydro Ordered"]

[Text] Ottawa—Ontario Hydro has been refused permission to start up a reactor at the Darlington nuclear power plant until further safety checks are made.

Concerns about an emergency shutdown system at the plant prompted the Atomic Energy Control Board decision yesterday.

It could delay the plant's start-up by a month or more.

"We're not saying the system is not safe, but that we haven't tested it enough to know whether it is safe," board president Rene Levesque told reporters after a four-hour hearing yesterday.

### First Defence

"We're concerned about the quality of design of the shutdown system," said Jim Harvey, head of the board's staff team that studied the \$12.5 billion Darlington plant in Newcastle.

An emergency shutdown system is the first line of defence against a major nuclear accident. Such systems are designed to immediately shut down reactors if malfunctions are detected, to prevent extreme heat, fires, or escape of radioactivity.

Arvo Niitenberg, Hydro senior vice-president, had asked the board for a licence to begin operating one of four Darlington reactors under low power to test various reactor systems.

If the tests checked out, Hydro would have asked the board for a full operating licence in early November.

That timetable could now be pushed back a month or more.

Niitenberg told the board delays in starting up Darlington will increase acid rain emissions from coal-fired power plants and will leave Ontario with less than satisfactory reserve power levels.

He said Hydro could be forced to buy more expensive U.S. power, which would boost electricity rates.

Harvey explained to board members yesterday that Hydro has installed North America's first computer-operated emergency shutdown system at Darlington.

Computer-operated safety systems are more common in reactors in France.

But Harvey said the board's technical staff was concerned about the software being used to run the computer programs at Darlington.

### Saskatchewan Tells Uranium Company To Clean Up Waste

51200003 Ottawa THE OTTAWA CITIZEN in English  
7 Oct 89 p A5

[Text] Regina (CP)—The Saskatchewan government has ordered the Cameco uranium company to correct serious problems with its storage of radioactive ore waste at its Key Lake mine.

"No immediate environmental emergency situation exists, but we must look at the situation today," Environment Minister Grant Hodgins said Friday.

The existing storage area for uranium ore waste—known as tailings—is not big enough and has problems with ice accumulation and slime, he added.

The mine, about 500 kilometres north of Prince Albert, was opened in 1983. Hodgins said it will likely wind up operations around the year 2000 and Cameco will have to manage the waste for years after that until it is safe to seal off the site.

## FEDERAL REPUBLIC OF GERMANY

### Prosecutors Prepare Cases in Nuclear Scandals

#### Nukem Nuclear Waste Scandal

51003042 Hamburg DER SPIEGEL in German  
30 Oct 89 pp 59-61

[Article: "Bribery, Illegal Deals, Silence"]

[Text] With about a hundred indictments, the legal authorities intend to deal with the largest bribery scandal in the history of the German nuclear industry.

As soon as Brend Jobst Breloer, 46, took over as head of the once scandal-plagued Hanau nuclear company, Nukem, he took action: he disposed of all divisions which had dealt with nuclear fuels, suspended all production of nuclear fuel elements and spent millions on a public relations campaign promoting the "New Nukem."

The series of advertisements was capped by a promise: "We won't be making any more headlines." The new man knows that he will not be able to keep his promise.

This is because the dubious past of Nukem and its subsidiary, Transnuklear (TN), will be presented this fall by the prosecution before the Hanau State Court. Nine atomic managers, 7 of whom were once highly paid employees of Nukem and TN, will have to defend themselves against charges of embezzlement and fraud. As a precaution, Breloer appealed to the media: "Please say that they are former employees."

For years the men in Hanau had taken radioactive waste from West German nuclear plants, promising to have it burned and compacted in Belgium and to send back the remnants, packed in barrels. During this period, the managers kept their customers so happy with small gifts and large cash payments that no one noticed what was really hidden behind the Transnuklear facade: a conspiracy to illegally transfer atomic waste to and from Belgium.

When the largest bribery scandal in the history of the German nuclear industry was revealed 2 years ago (SPIEGEL No 18, 1987), first TN and then its parent company, Nukem, were closed. Suddenly no one found it far fetched to suspect that the companies might even have transferred nuclear-weapons material.

The case triggered a judicial chain reaction: approximately 100 indictments. The recipients of the bribes will also be prosecuted. These include a number of security and radiation safety managers from West German nuclear power plants, according to public prosecutor Wolfgang Popp "80 to 100 people."

"Because of the nature of the affair" (according to the public prosecutor's office), none of them declared their special income to the tax authorities. The investigators doubt that they know all of those who were bribed, because "bribes are paid secretly, without records and receipts."

As a result of their investigations, the prosecutors have come to the conclusion that the Hanau nuclear managers did not, as they originally claimed, lose control of their Belgian operations as a result of overwork. On the contrary, the crimes were planned. From the very beginning it was clear that most German waste could not be processed in Belgium because of its high degree of radioactivity.

In (prohibited) exchange for their atomic waste, the German nuclear power plants, supposedly without their knowledge, received compressed Belgian nuclear waste. The radioactivity of the Belgian nuclear waste was increased by the addition of nuclear fuel material especially for the purpose of the illegal shipment into the FRG, so that the level of radiation was correct.

The investigators have determined that the bribes began at precisely the same time that the Belgian business was started. The purpose of the payments was evidently to prevent the employees of the nuclear power plants from becoming too interested in where a large portion of West German nuclear waste really ended up. Until the end of 1983, the highly radioactive evaporator concentrates from, for example, the Biblis reactor, were declared as Belgian waste and simply dumped in the North Sea.

The public prosecutor's office also sees grounds for fraud prosecution in the fact that the West German reactor operators were falsely led to believe that the waste was being properly treated. Three atomic managers, including the former financial director of Nukem, are to be made responsible for this.

The 3 accused, along with 6 others, will also be indicted for embezzlement. According to the investigators, those to be indicted used false bills to transfer company money into a secret fund, which was then used for bribes, which according to the investigations of the state prosecutor's office amounted to around 5 million marks.

The evidence indicates that the employees pocketed some of the misappropriated funds themselves. There is, for example, an entry in the TN accounts, which were handled by Nukem, for the purchase of a "special vehicle," which according to the records was soon afterwards destroyed because of radioactive contamination. In fact, as the company management was well aware, the vehicle was a new car which was given to a power plant employee as a bribe.

But the bosses were unaware of the fact that the recipient of the bribe, according to chief public prosecutor Albert Farwick, did not receive the car as a gift. Instead it was sold to him "at a lower price, approximately a 20 percent discount." The rest of the money was then "pocketed" by a TN employee.

Further company funds were used for "visits to bars and bordellos" (Farwick). One important TN manager is accused of having embezzled the proud sum of DM 25,184.70 by means of "falsified entertainment expenditures" within a period of 2 years.

Wilhelm Bretag, a 51-year-old TN division chief, appears to have gone the farthest. A scientist at the Swiss Institute for Reactor Research, who produced small

studies for Nukem, consistently had to pay about 20 percent of his fees to one of Bretag's accounts at the Schweizer Bankverein—sometimes 2000 Swiss francs, sometimes 3260.

The investigators also discovered that a payment in the amount of 700,000 Swiss francs had been made to this account "in Belgian currency." The prosecutors assume that this is a "cash return," "a kick back"—and that they are thus on the trail of more missing millions.

Bretag was, in fact, responsible for payments of around 24 million marks to a Belgian service company which assisted TN representatives in Mol. The public prosecutor's office and Nukem have jointly calculated that these payments were from "7 to 16 million marks too high." The search for the money is currently under way. One location which is being investigated is a Rotterdam patent assessment company which also received huge payments from the Belgian TN representatives.

To their astonishment, the prosecutors have noted that the new Nukem, in its efforts to distance itself from previous dealings, is not even making an effort to recover the millions "which were wasted and embezzled" (public prosecutor Wolfgang Popp). According to Popp: "Nothing is being said about this."

#### NTG Nuclear Proliferation Case

51003042 Hamburg DER SPIEGEL in German  
6 Nov 89 pp 125-131

[Article: "A Swamp Without End. Worldwide Black Market Dealing in German Nuclear Material"]

[Text] After months of investigation the Hessian prosecutors are now certain: German nuclear businessmen have violated the Nuclear Nonproliferation Treaty. Critics fear that the charges in the to date greatest scandal involving the export of nuclear material will again damage the FRG's international reputation.

It seems that the worst has happened. The FDP [Free Democratic Party] politician Gerhart Baum spoke in horror of "incalculable, even foreign-relations consequences." SPD [Social Democratic Party] member Volker Hauff dramatically diagnosed "a political catastrophe for our nation." And Bundestag deputy Otto Schily, still with the Greens, asked shrilly, "Where is the nationwide manhunt?"

The apocalyptic mood in the Bundestag was triggered by a Christian Democrat. In January 1988, Hesse's prime minister, Walter Wallmann had expressed the "horrible suspicion" that the Nuclear Nonproliferation Treaty might have been violated by the transfer of "nuclear-weapons-capable material" from Hanau nuclear companies to Pakistan and Libya.

An international media storm began immediately. Politicians competed with sketches of crisis scenarios. The

reputation of the republic seemed ruined. But Wallmann's suspicion could not at that time be confirmed. The Christian Democrat soon meekly confirmed that he had "no concrete proof."

What at that time turned out to be an embarrassment for the nuclear politician Wallmann may soon be interpreted as wise foresight. This is because there is now solid evidence for the "incredible charge" (Hauff). Hanau public prosecutors now believe that there is sufficient evidence to suspect that German exporters "have violated [the laws] regarding the nonproliferation of nuclear weapons."

The loss of innocence has occurred. The prosecutors do not however suspect the scandal-ridden Hanau company Nukem, but rather the Neue Technologien [New Technologies] GmbH (NTG) in nearby Gelnhausen. The investigators believe that former employees of the 100-man company transferred know-how and nuclear material to Pakistan, so much, in fact, that that nation, which is suspected of building the bomb, has now been made independent of outside nuclear suppliers.

Critics fear that the scandal will again hurt Bonn's international reputation, since this, according to Hermann Bachmeier (SPD), the chairman of the Bundestag Atomic Investigation Committee, is "probably the most serious illegal nuclear export in the history of the FRG." The export control authorities, who are part of the Federal Economics Ministry, are not guiltless in this affair. Despite hard evidence, the officials took no action.

For months, prosecutors Albert Farwick and Reinhard Huebner have been interrogating numerous witnesses, searching offices and plants, and evaluating export papers and documents. According to one investigator, "a swamp without end" was exposed.

Piece by piece, they assembled a nuclear mystery story, which takes place between Gelnhausen and Garching, Hong Kong and Karachi. The investigators discovered that the NTG employees had made use of a wide network of advisors, suppliers and shippers. They had received help from scientists from such respected research institutes as the Max Planck Institute for Plasma Physics in Garching and the Nuclear Research Center in Karlsruhe, as well as from employees of prominent German companies, such as Degussa and the Metallgesellschaft [metal corporation] in Frankfurt.

The prosecutors intend to present their indictments in the middle of November. Five people—exporters or shippers—are currently under suspicion, a half dozen further investigations are in progress. The prosecutors accuse Rudolph Maximilian Ortmyer, the 52-year-old former managing director of NTG, and his assistant, Peter Finke, 46, of violating the Foreign Trade and Military Weapons Control Law. According to the investigators, they supplied to Pakistan:

- in "59 shipments of documents" practically the complete know-how required to set up nuclear-fuel-element production as well as valuable information and blueprints for reactor technology, uranium enrichment and nuclear fusion;
- in 68 individual shipments important high technology units for the production of fuel elements—from sinter ovens to electron stream welders—and raw material for the construction of uranium centrifuges, tons of special steel for the production of fuel element cladding tubes, and special containers for uranium-hexafluoride, a substance required for uranium enrichment;
- a unit, useful only for military applications, for the recovery and production of pure tritium as well as 0.8 grams (with a radioactivity level of 296,000 gigabecquerels) of the radioactive gas, which even in small amounts is useful as an explosive-force enhancer in the construction of atomic bombs.

In addition, according to the investigators, sensitive nuclear products also went to India and South Africa. Offers were also made to Saudi Arabia. Ortmayr also used tricks to obtain presumably secret blueprints from U.S. research centers such as Lawrence Livermore near San Francisco, Argonne in Chicago and the space agency, NASA.

The authorities often found out nothing about the dubious transactions. The goods, generally falsely declared, were rushed through customs. Prosecutor Farwick stated to the Bonn Nuclear Investigation Committee, "We did not discover a single case in which these false declarations were detected by a check." His conclusion: "Under the current system" of export monitoring not even "25-percent monitoring" is possible.

The export control authorities from the Bonn Economics Ministry and its Eschborn office, the Federal Office for Commerce (BAW), discovered the illegal transfers of NTG on several occasions. But even then, according to prosecutor Huebner's testimony before the committee, they only had "understanding discussions" with Ortmayr. Instead of scrutinizing Ortmayr's statements, some export control officials "more or less" cooperated with him.

Thus, for a long time Ortmayr had no need to fear that he would be found out. Ortmayr, who was trained as a toolmaker, and who previously worked for the Reaktor-Brennelement [reactor fuel element] Union of Hanau, switched over to NTG in 1971 and quickly advanced to the position of technical managing director. As early as the late 1970's, Ortmayr established his first contacts with Pakistan through Klaus Kaspar, who was then chief of the export section of Degussa and is now vice president of a Japanese Degussa subsidiary.

Local help, according to the investigators, was provided by Juergen Wellensiek, a representative of the Hamburg import-export company Riekermann, who introduced

Ortmayer to members of the Pakistani atomic commission, made sure that initial "deals were prepared" (Huebner), and, according to the investigations of the public prosecutors, collected considerable commissions.

Soon business was booming. The Pakistanis brought their German visitors to their remote nuclear research centers, which are strictly sealed off by the military. There the visitors saw obsolete equipment and received long wish lists—from vacuum pumps to uranium smelting equipment, from lasers to lithium 6, the raw material needed to produce the bomb substance, tritium.

Between 1983 and 1988, Ortmayr and Finke exported around 20-million-marks-worth of machines and material to Pakistan. Ortmayr told the investigators that the sales had saved jobs, since the company had been on the verge of bankruptcy.

The small NTG company was, however, often unable to build the complicated facilities and devices itself. For this reason, Ortmayr set up an extensive network of scientific advisors and high-powered suppliers.

First of all, he recruited Peter Finke, a physicist from the Darmstadt Society for Heavy Ion Research (GSI). Ortmayr discovered that Finke could express himself better in English and also knew more about the technical details. For these reasons, Finke was hired. He worked at first for NTG, but he soon afterwards set up his own dummy company, which was presumably used to disguise the illegal transfers and to obtain commission fees.

Soon another GSI employee was recruited, whom the prosecutors suspect of having copied blueprints and prepared technical drawings. There were also scientists at the Karlsruhe Nuclear Research Center, which is 90-percent-owned by the federal government, and at the Juelich Nuclear Research Center who "were helpful." From Juelich, Ortmayr obtained 3 special storage containers, so-called uranium getters, for the tritium retrieval facility, which were classified as especially sensitive technology by the investigators.

Heinrich Weichselgartner, 54, a tritium expert from the Garching Institute for Plasma Physics, became Ortmayr's most important scientific advisor. Ortmayr became acquainted with Weichselgartner in 1981, when he acquired from the institute the production rights for a process for removing tritium impurities which had been developed by Weichselgartner.

The modest scientist was impressed by the financial manager's lavish lifestyle: lobster dinners, a \$90 silk tie as a gift. Soon Weichselgartner was so involved that he too founded his own small company and helped Ortmayr to obtain the tritium which was so desired by the Pakistanis.



The initial order of the Pakitanis was for 10 grams of tritium, a very great amount. According to the information which the prosecutors have, Ortmayer promised to deliver about half of this amount. But this did not happen.

The exporting of 0.8 grams of the substance in 1985 and 1986 had been difficult enough. The radioactive gas had been obtained from Radium-Chemie AG of Teufen, Switzerland. Because this company did not want to deal directly with Pakistan, the Schwenning luminous paint manufacturer, Gutekunst, was used as an intermediary.

On 4 April 1985, Gutekunst properly requested information from the BAG on what requirements had to be fulfilled in order to export tritium to Pakistan. The answer came quickly that the exportation of tritium to Pakistan required government approval. The letter was accompanied by a sample form. Gutekunst did, in fact, submit a request—but with Hong Kong specified as destination. The officials noticed nothing, and the shipment was approved.

Thus the 8 gas containers reached Hong Kong. They had been declared as full but were, on the contrary, empty. Meanwhile the tritium went illegally to Pakistan in bottles which were marked empty. The fact that so much effort was expended to disguise the shipment is easy to explain. In the opinion of the prosecutors the illegal exportation of tritium is "a crime against the Military Weapons Control Law"—maximum sentence: 10 years.

The path which the equipment for recovery of tritium took was also complicated. Besides NTG, 4 dummy companies were involved in the deal. In addition, important parts were obtained from suppliers, including Kimmel-Apparatenbau of Munich, Balzers of Wiesbaden and the laboratory instrument manufacturer Koettermann of Uetze, Lower Saxony.

The prosecutors believe that these companies did not realize that their shipments were being exported to Pakistan. However, individual employees of the companies are believed to have performed valuable support services.

For example, the Reaktor-Brennelement Union, which is now the Siemens Brennelementewerk [fuel elements plant] Hanau, Uranium Processing Division, was tasked with material inspections. Ortmayer had a buddy at this company. The investigators know that another friend, the Degussa employee, Kaspar, obtained patents and know-how from his company and opened doors wherever he could.

This was done, for example, at Leybold-Heraeus (since October; Leybold AG), a Degussa subsidiary in Hanau. The vacuum technology specialist provided the key element for the electron stream welding unit. The prosecutors believe that the supplier must have known that the device was intended for processing zircalloy, a special alloy used to produce certain types of fuel element.

The Metallgesellschaft of Frankfurt, which until recently owned part of Leybold-Heraeus, produced a set of fuel rods for NTG, which were later exported to India.

NTG exported a total of approximately 30 tons of zircalloy, declared as high quality steel. The metal was sold for such high prices that even the officials of the Federal Statistical Office, which calculates the foreign trade balances every year, became suspicious. But they were quickly pacified, when Finke told them that the "relatively high price" was a result of the "high precision" of the pipes.

The material came for the most part from France. Monitoring officials there soon began to wonder what so many zircalloy pipes were being used for in Germany. They contacted the company and informed the FRG foreign ministry, which in turn referred the information to the Economics Ministry, where an official, Hans-Juergen Spies, was entrusted with the investigation.

The official, who was already in contact with the NTG director and who had already visited Gelnhausen for informal meetings, without further ado read the information to Ortmayer. Then Spies naively inquired, "Well, what are you doing with it?" When Ortmayer claimed that there would be an investigation, but that it "was not yet ready," Spies was satisfied.

The negligence of the export control authorities in the case of the tritium equipment export was even worse. As internal documents show, the transaction could have been prevented, if the officials had acted on concrete evidence from the U.S. embassy (SPIEGEL No 24, 1989).

According to a report of the prosecutors, the equipment for recovering and storing 60 grams of pure tritium is designed "exclusively for nuclear weapons production." The Americans had repeatedly warned against the exportation of this equipment in secret service reports, so-called non-papers. They insistently asked Bonn, for example on 1 December 1986, to "take all conceivable steps" to prevent such an export.

But the Bonn and Eschborn bureaucrats saw no need to act. Four weeks after the last U.S. warning, the tritium system departed unmolested in the direction of Pakistan: packed in 2 sea crates on the freighter "Ayubia," departing Hamburg on 30 December, and the next day another container by air freight on Pakistani International Airlines (flight number PK 716). Prosecutor Huebner commented tersely before the Bundestag Nuclear Committee on the negligence of the officials: "The public prosecutor's office would have decided differently."

The first evidence of the strange nuclear dealings also did not come from the export control authorities, but rather from the commission for the investigation of suspected tax evasion. As the investigators now know, Ortmayer had granted himself very generous commissions, which he did not report to the tax authorities.

The additional income was received by the numerous dummy companies for their services as intermediaries, generally from NTG. The money was then used to cultivate the worldwide clientel. The Pakistani customers were provided with porcelain, gold bars and 5-figure sums of cash. Scientists, such as Weichselgartner, received smaller sums, while Finke received larger amounts—the millions, however, are said to have been pocketed by NTG managing director Ortmayer.

Ortmayer and Finke are now also being accused of tax evasion. Ortmayer is also being charged with embezzlement. In addition, there are the violations of export-import laws and the Military Weapons Control Law.

The monitoring officials have also been indicted. Social Democrat Bachmeier says that the result of the investigations has been a "black eye for the export monitoring authority."

The prosecutors view the incriminated shipments, whether sinter ovens or welding equipment, rod adjustment machines or vacuum smelting equipment, as parts of a whole facility which "is designed for fuel element production"—in other words, links in a chain which leads, according to secret service reports, to the Pakistani bomb.

But the Eschborn officials, following standard procedure, had, in the cases they dealt with, only evaluated the individual pieces of equipment and not recognized or not wanted to recognize the real purpose in the context of the whole project.

And yet, even Finke, the atomic exporter, became concerned. While he was testing a tritium facility in the summer in Pakistan, he found himself surrounded by soldiers with submachine guns in a sealed-off research center. Finke reported that the complex, which from the washroom to the tritium laboratory had been almost entirely planned by NTG, is located in a remote area, about 100 km distant from the Pinstech atomic center in Rawalpindi, of which it is formally a part. The area is protected by walls, which are more than 2 meters high and topped with barbed wire. The buildings have been painted green for camouflage purposes.

Across from the laboratory, Finke saw a tunnel entrance which he found suspicious. He testified to the investigators that tritium is stored there, and that, in addition, "military equipment and containers" were being packed and unpacked in the underground construction.

Perhaps the bomb filling station for the Pakistanis? At any rate, Finke had become distrustful. He scribbled an old Latin saying into his notebook: "Whatever you do, do it cautiously and consider the consequences."

## FRANCE

### LE MONDE Criticizes Aid to Iraq

90ES0005Z Paris LE MONDE in French  
17-18 Sep 89 p 1

[Commentary: "Reconstruction and Armament"]

[Text] Business is business. So it is natural that French business circles should be delighted with the agreement rescheduling part of the Iraqi debt: The advantageous conditions granted to Baghdad will enable COFACE (French Foreign Trade Insurance Company) to resume its guarantees to French firms doing business in Iraq. That has not been the case since 1986, when the Iraqis, exhausted by their war effort against Iran, stopped making payments on their military and civilian purchases.

The cease-fire between Iran and Iraq has restored a little of Baghdad's oxygen. Iraqi negotiators are tough: Almost a year was required to reach the agreement, which is by no means one-sided, since Baghdad will have 6 or even 9 years in which to pay off most of its debts falling due at the end of 1989.

The Iraqi regime's total indebtedness is up to \$16 billion. And to make its partners give in, Baghdad is a master at using the competition and holding out the prospect of fabulous contracts for the reconstruction of a country ravaged by war.

Paris knows perfectly well that there will be nothing civilian about a good many of those contracts, if they are signed. If Iraq is seeking new financial respectability, the main reason is that it wants to beef up its armament. It was not by chance that on Friday, the Dassault Company was already applauding the signing of the agreement. That agreement was the necessary condition for the conclusion of negotiations for the sale of 50 Mirage 2000's. It is also known that the Iraqis have put together a financial and industrial network for gaining access to advanced military technologies and acquiring, for example, improved medium-range missiles.

Considering that no peace treaty between Tehran and Baghdad is in sight, that Iraq has just interfered in the Lebanese imbroglio to checkmate its Syrian brother-enemy, and that the Israeli-Arab conflict may flare up again at any moment, contributing to the rearmament of Iraq (or of Iran, for that matter) constitutes a heavy responsibility. That remark applies not only to Paris, by the way, but also to Moscow, which is Iraq's traditional supplier but which nonetheless has just signed a huge cooperation agreement with Iran, and to Great Britain, which is feeling tempted to regain a foothold in the Iraqi arms market.

At a time when celebration of a new international climate is in fashion and a concern is being shown to eliminate regional conflicts, is there not some degree of irresponsibility in throwing oil on fires that are not

completely out? But let us dream—why not imagine a dialogue between those countries—and others—on the topic “yes to reconstruction; no to excessive armament”?

### **Siemens, Framatome Reactor Cooperation**

90WP0009A Paris *LE FIGARO (LE FIG-ECO SUPPLEMENT)* in French 19 Oct 89 p 7

[Article by E.T.]

[Text] The new model for the joint nuclear station, planned by Framatome and Siemens, should be ready in 1993-1994. Marcel Chabrilac, director of Framatome nuclear engineering department, made the announcement yesterday, during the opening of the 3-day long “3 N” Symposium, New Nuclear Needs (nuclear products and services), to be held in Paris.

NPI (Nuclear Power International), the subsidiary created by the two builders last April, will therefore not be outstripped by its US competitors, since the reactors currently under study at Westinghouse and General Electric are not expecting their license of operation before 1995-1996 (see our issue dated 18 October 1989).

Chabrilac declared: “It involves a tremendous effort since we are starting from scratch.” As a matter of fact, all the concepts will be studied anew, beginning with the station’s safety organization.

### **‘An Attack of Urticaria’**

These reactors will be conceived to meet both French and German standards—which are nearly alike—as well as those of the United States. Finally, the power, superior to that of the machines being planned in the United States, but inferior to the power currently required by the EDF [French Electric [Power] Company], should run to 1,000 megawatts. The agreement signed by Framatome and Siemens provides that the models developed by their subsidiary will be reserved for third markets.

With regard to the problems raised by the restructuring of Framatome shareholding, company chairman Jean Claude Leny compared the current difficulties to “an attack of urticaria.” He further stated: “In no way are we responsible for this situation. This crisis is outside the company. I hope that it will end as it started.” Leny is known to oppose Pierre Suard, the CGE [as published] president, who owns 40 percent of Framatome. The Ministry of Industry wanted Suard to play a role of “industrial participant.” With barely concealed pleasure, Leny recalled that, since its creation, Framatome had changed stock holders approximately every 2 years, and that one of them, Creusot Loire, which appeared to offer all guarantees of perennality, was presently no longer in the picture.

Finally, Jean Claude Leny pointed out that the cooperation agreement signed between Framatome and Siemens presented no particular danger. “We are working on equal footing within the NPI. I cannot see how Siemens could begin anything against Framatome.”

### **Crane Damages Super-Phenix Dome**

LD0211115389 Paris *Domestic Service* in French 1100 GMT 2 Nov 89

[Text] An accident has occurred at the Super-Phenix nuclear power station: The dome of the reactor was damaged by a crane derrick, which had accidentally become detached. According to ecologists, the accident is serious as there is a risk of brittleness in the reactor containment vessel, a vital unit in the power station. However, the power station director states that there is no danger, as the dome of the reactor was closed at the time of the incident.

## **IRELAND**

### **Fallout From Chernobyl Said Still Affecting Irish Sheep**

51500026 Dublin *IRISH INDEPENDENT* in English 15 Sep 89 p 10

[Article by Tony O'Brien, environment correspondent]

[Text] High levels of radio-caesium continue to be found in Irish mountain sheep as result of the Chernobyl nuclear power disaster three years ago. However, the Nuclear Energy Board (NEB) says there is no danger to public health.

Extensive on-going monitoring of sheep on farms, in slaughterhouses and in butchers has been carried out by the NEB following the explosion at Chernobyl in April 1986. Heavy rainfall at that time resulted in fallout hitting Ireland.

The detailed study, carried out during 1988, covered a total of 1,238 farms and 26,970 animals. Of these 3,455 showed readings above 600 Becquerels per kilo (Bq/Kg), of which 1,021 were above 1,000 Bq/Kg.

The highest activities measured were in counties Donegal, Sligo, Leitrim, Cavan and Waterford. A small number of animals in excess of 1,000 Bq/Kg were identified in Mayo, Roscommon, Louth, Tipperary and Kerry with the highest individual measurement just under 3,000 Bq/Kg.

More than 46,000 animals were measured during 1988 in slaughterhouses serving both the domestic and export markets. Of these 99.5 p.c. showed measurements below 200 Bq/Kg while just four animals exceeded 600 Bq/Kg and these were returned to farmers for lowland finishing.

Analysis of 223 samples of sheepmeat from butchers' shops showed an average of 9.5 Bq/Kg which, at normal consumption rates, corresponds to an annual dose equivalent to less than 0.1 p.c. of the recommended dose limit for members of the public.

The report concludes that the regular consumption of sheepmeat, even at the highest levels measured on some upland farms, "does not constitute a significant radiological health hazard."

## TURKEY

### Official Defends Nuclear Energy Plans

NC0711102789 Istanbul HURRIYET in Turkish  
1 Nov 89 p 12

[Text] Ankara, (A.A.)—Atilla Ozmert, chairman of the Turkish Atomic Energy Association [TAEA], has said that Turkey will not abandon the idea of generating nuclear energy. He also asserted that a 25- or 50-megawatt nuclear power plant will be constructed in the vicinity of Akkuyu.

Ozmert disclosed that TAEA has put into effect a "project for developing a nuclear reactor" and noted that it will be realized by 1994. He asserted that the project will be the basis of Turkey's nuclear reactor technology.

Noting that the project was aimed at developing nuclear technology in Turkey, Ozmert said: "Putting a nuclear power plant into operation requires 9 or 10 years. We plan to carry out an experimental program for generating nuclear energy. The power plant that has been considered will not be a system which will significantly reduce shortage of power in the country. However, the social and technical benefits of the system will be immeasurable."

## UNITED KINGDOM

### Pollution From Sellafield Plant Deemed Unacceptable

51500021 London THE DAILY TELEGRAPH in English 9 Oct 89 p 11

[Article by R. Barry O'Brien: "Pollution From Sellafield '13 Times Over Limit'"]

[Text] A survey has found radioactive contamination from the Sellafield nuclear reprocessing plant in Cumbria up to 13 times higher than recommended limits, the environmental group Friends of the Earth claims in a report today.

Banks of the nearby River Esk and adjacent low-lying land inundated by high tides are contaminated extensively by plutonium, ruthenium, caesium, americium and other radionuclides, the report says.

It calls on Mr Gummer, Agriculture Minister, to order an urgent investigation of public exposure to radiation in the area and to publish the results.

Members of the public, farmers and people fishing who spent more than 34 hours a week locally would have

radiation doses exceeding limits recommended by the National Radiological Protection Board, the report says.

"This does not take into account the additional risk to exposure due to inhalation or ingestion of the contaminants, particularly of americium or plutonium."

The ministry is also asked to carry out an aerial survey along the Cumbrian coast to identify other areas of contamination and order all discharges from Sellafield to be stopped.

The survey covered a four-mile stretch of the River Esk from Hinninghouse Bridge to the Eskmeals Viaduct.

Both north and south banks and adjacent land subject to tidal inundation were surveyed.

Suspended radioactive particles were deposited on land every time there was a very high tide or a storm, says the report.

Discharges into the sea from the British Nuclear Fuels processing plant at Sellafield on the Cumbria coast north of the Esk estuary are blamed as the source of the contamination.

In places, radioactive contamination was 13 times the limit recommended by the National Radiological Protection Board, and 50 times the level at which it recommended that public exposure to radiation should be investigated.

Radioactive contamination from Sellafield above the board's recommended limits has also been found recently on the North Wales and South-West Scotland coastlines, it says.

The report, Unacceptable Levels, from the Friends of the Earth radiation monitoring unit, claims the survey's findings highlighted the inadequacy of official monitoring programmes.

"People living in the area were not generally aware that high levels of contamination existed. This is inexcusable."

The report accuses the Ministry of Agriculture of failing to alert people to contamination locally. It asks the Minister, Mr Gummer, to explain his failure to inform the public.

A ministry spokesman said: "We reject the suggestion that our monitoring is inadequate. If there is evidence to suggest there are high levels of contamination somewhere, we would like to see it."

"We do regular and detailed monitoring of all pathways for discharges from Sellafield, including the River Esk, and we are satisfied that this was demonstrated that exposure is well within appropriate limits."

"We saw a preliminary draft of the Friends of the Earth report in April and found misinterpretation and misuse of limits recommended by the National Radiological Protection Board."

A spokesman for British Nuclear Fuels said: "We test tens of thousands of different samples taken inside and outside BNF sites each year. Sampling at Sellafield produces 100,000 analytical results annually."

"Our results are supplied to and checked by the Ministry of Agriculture and the Department of the Environment."

"They also carry out their own independent monitoring, as do several independent organisations."

"Limits obviously vary from area to area, but continuing assessments confirm the absence of any cause for concern."

Mr Paul Watts, co-ordinator for the Friends of the Earth radiation monitoring unit, said: "We don't accept at all that we have misinterpreted limits."

"We are not saying that dose limits have necessarily been exceeded."

"What we are saying is that there is a clear case for an urgent and detailed investigation of public exposure to radiation in this area."

"The NRPB says that if limits are exceeded by 25 per cent there should be a detailed investigation of the critical exposure group, and in places we found the limit was exceeded by a factor of 50 per cent."

*Unacceptable Levels: a report by Friends of the Earth's Radiation Monitoring Unit of the Sellafield contamination of the River Esk. £3.50 from Friends of the Earth, 26-28 Understood Street, London N17JQ.*

### **Electricity Board Prosecuted for Nuclear Safety Lapse**

51500023 London THE DAILY TELEGRAPH in English 6 Oct 89 p 7

[Article by Roger Highfield, science editor]

[Text] The Central Electricity Generating Board is to be prosecuted for the first time by the nuclear watchdog for an alleged lapse of safety at a nuclear reactor during an incident that has already cost the board millions of pounds.

The Health and Safety Executive's Nuclear Installations Inspectorate is to prosecute the CEGB for two alleged breaches of site licence conditions at Dungeness B nuclear power station in Kent.

Nuclear fuel was dropped into the core of one of the station's two reactors on Feb 4 this year. The reactor is still not back in action, a shutdown that is estimated to cost hundreds of thousands of pounds each day.

The maximum fine for cases heard by magistrates under the Health and Safety at Work Act 1974 is £2,000 for each offence. However, it is open to the magistrates to commit cases for trial in the Crown Court, which may impose an unlimited fine.

It is alleged that, because of a failure to follow maintenance instructions at Dungeness, a fuel assembly was incorrectly maintained, resulting in it being dropped into the core of the reactor.

The inspectorate also alleges that an inspection team carried out unauthorized actions on Feb 21, this year which resulted in the dropping of a 2-1/2 ton weight about 27 ft in a maintenance facility.

While the radiological consequences of the events which occurred were negligible in the first case, and nil in the second, the inspectorate is prosecuting because of the importance it attaches to compliance with the requirements for the proper control of fuel handling activities at the site.

Nuclear site licenses are granted to operators by the Health and Safety Executive and are administered by the inspectorate.

Mandatory conditions are attached to these site licenses, covering, for example, the need for maintenance to be carried out in accordance with maintenance instructions, and for inspections and tests to be carried out in accordance with written instructions.

The case is due to be heard by Folkestone magistrates on Nov 16.

### **Sizewell Reactor Passes Safety Test**

51500019A London THE DAILY TELEGRAPH in English 17 Oct 89 p 4

[Article by Roger Highfield]

[Text] A demanding test to prove the strength of Britain's first pressurized water reactor during a major accident has been successfully passed, National Power announced yesterday.

A 23 ft model of the dome-shaped containment building which will house the Sizewell B nuclear reactor in Suffolk, withstood pressures almost 2-1/2 times those estimated to occur during an accident when steam bursts out of the reactor.

"This model is the first of its kind to be tested in the world," said Mr Roger Blundell, manager of the project. The model behaved as predicted by computer, he added.

The test—carried out at the Taywood engineering laboratories at Southall, west London, to fulfill a commitment to the Nuclear Installations Inspectorate—was financed internationally.

It was witnessed by representatives from Japan, France and American as well as Britain.

The inspectorate demanded that the containment withstand ultimate pressure of not less than twice the design pressure of 50lb per sq in, and that the predictions of the computer model prove accurate.

The computer predicted two types of failure at pressures well above the demanded level. One was a failure of the base of the model and the second a failure in the walls.

The model—designed by Nuclear Design Associates, the civil design consultants for the Sizewell B project and weighing more than 125 tonnes when filled with water and bristling with more than 700 instruments—ultimately failed at the base as predicted.

Mr Blundell said that the team now hoped to test the second failure level forecast by the computer.

“The £500,000 programme has clearly demonstrated the strength of the containment and its ability to withstand the faults for which it is designed,” said Mr Brian George, chief of the PWR project board responsible for Sizewell B and subsequent PWRs.

These are planned for Hinkley Point, Somerset. Wylfa on the Isle of Anglesey and again at Sizewell.

### **North Wales Said Still Badly Affected by Chernobyl**

51500007 London *THE DAILY TELEGRAPH* in English 18 Sep 89 p 5

[Text] Parts of North Wales contaminated by radioactive fallout from the Chernobyl disaster in 1986 are still badly affected, according to a report issued today by Friends of the Earth.

The group used equipment supplied by the Atomic Energy Authority to monitor more than 450 vegetation samples.

Its survey claimed that an area around the Gwynedd town of Bala—where restrictions on the movement of stock were lifted three years ago—was still as contaminated with radioactive caesium as adjacent tracts still under restriction.

Friends of the Earth scientists also claimed that near the Powys village of Llangurig, current levels were high enough to suggest that contaminated lambs could have entered the food chain three years ago.

The group's spokesman, Mr Paul Watts, said: “No restrictions were ever introduced in this area, which received heavy rainfall when the Chernobyl cloud passed over it three-and-a-half years ago.”